TECHNOLOGY DEPT.

Gas Journal

VOL. 288. 108th YEAR. LONDON, OCTOBER 31, 1956. No. 4868. PRICE 1/6

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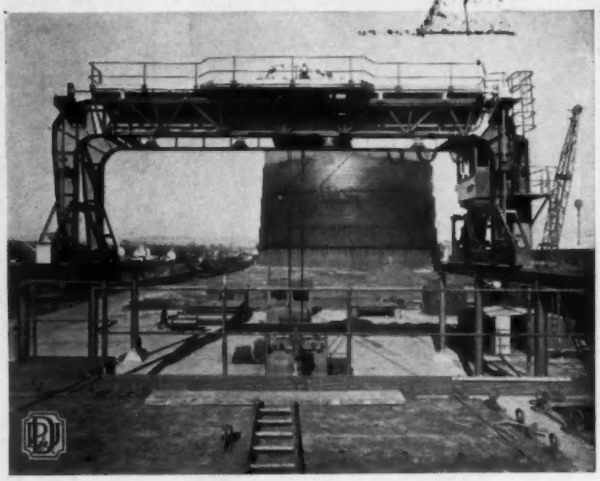

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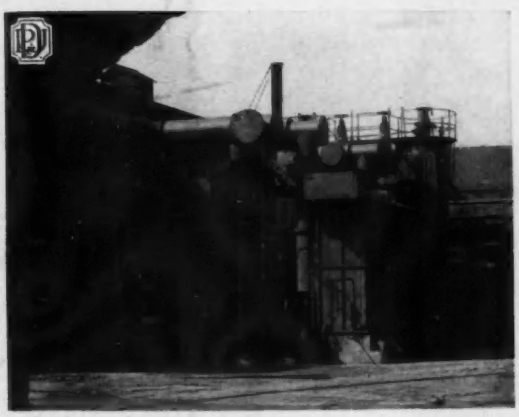

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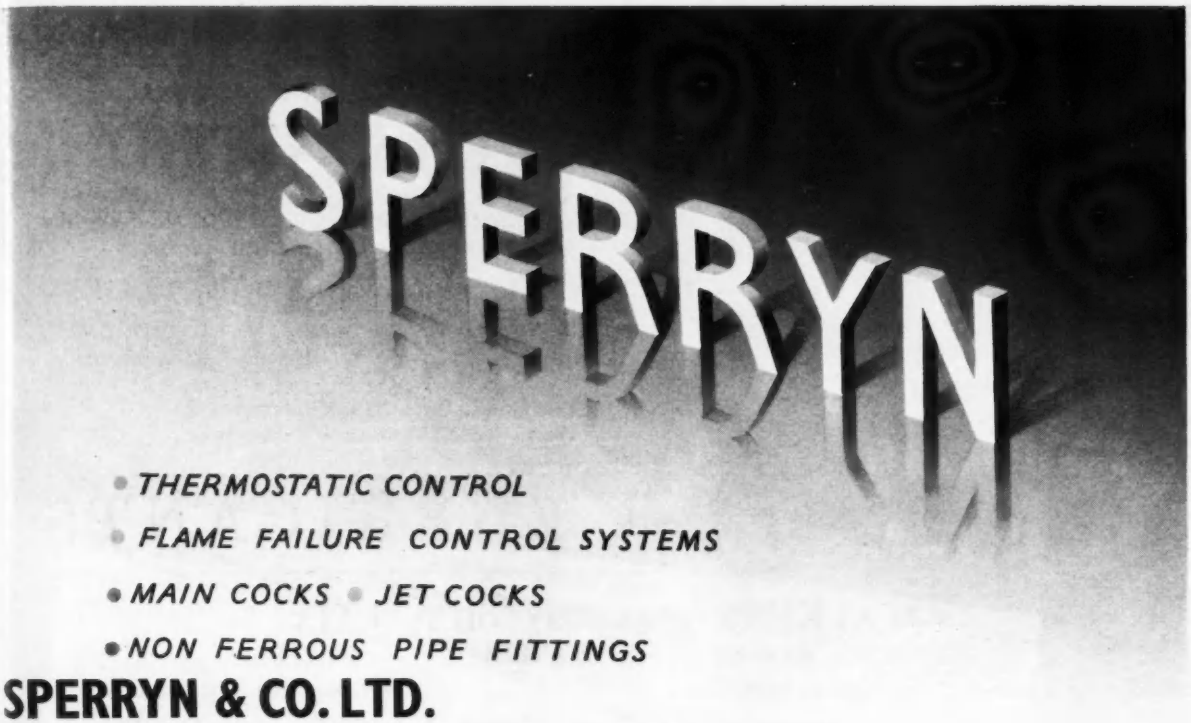

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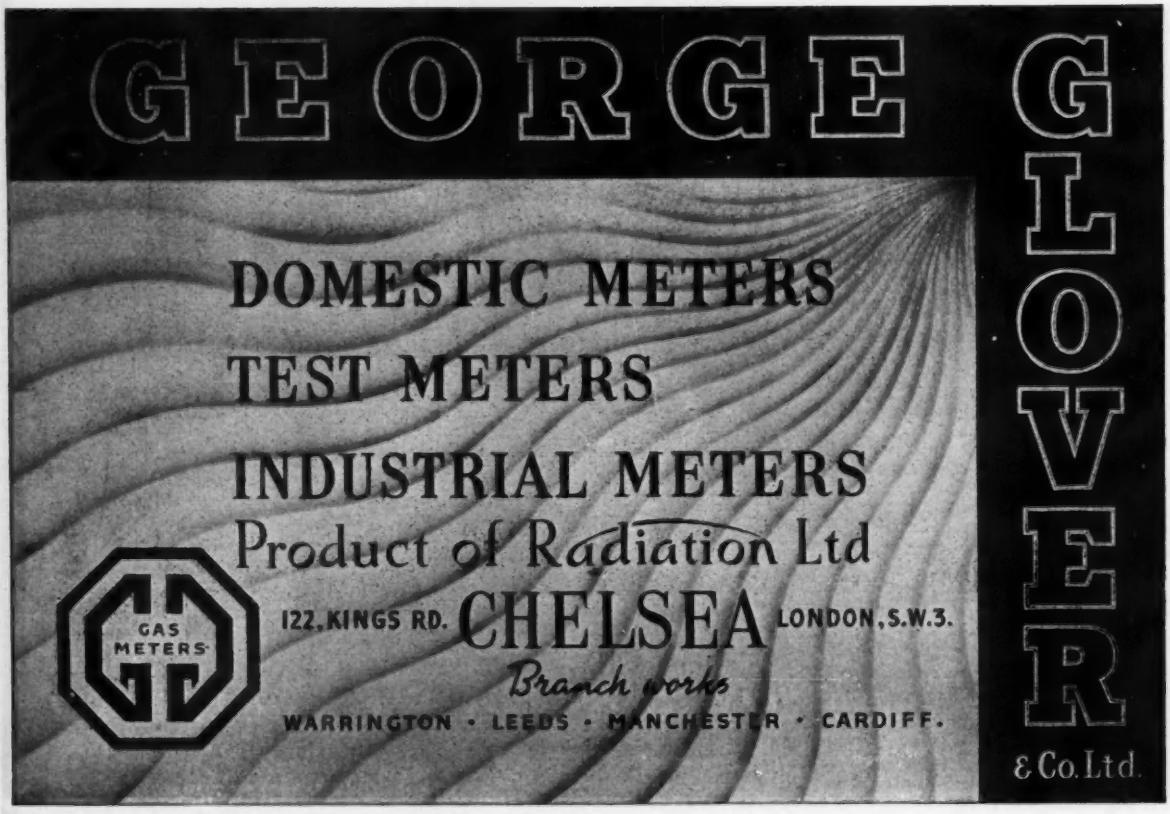

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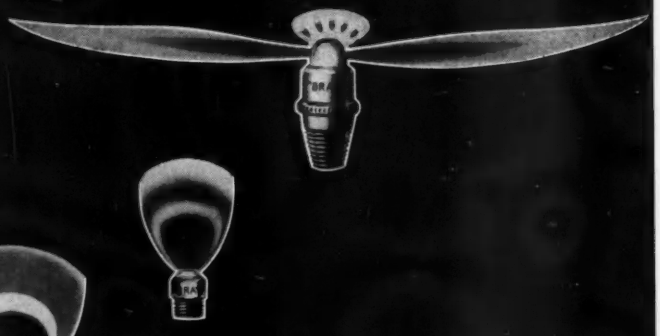

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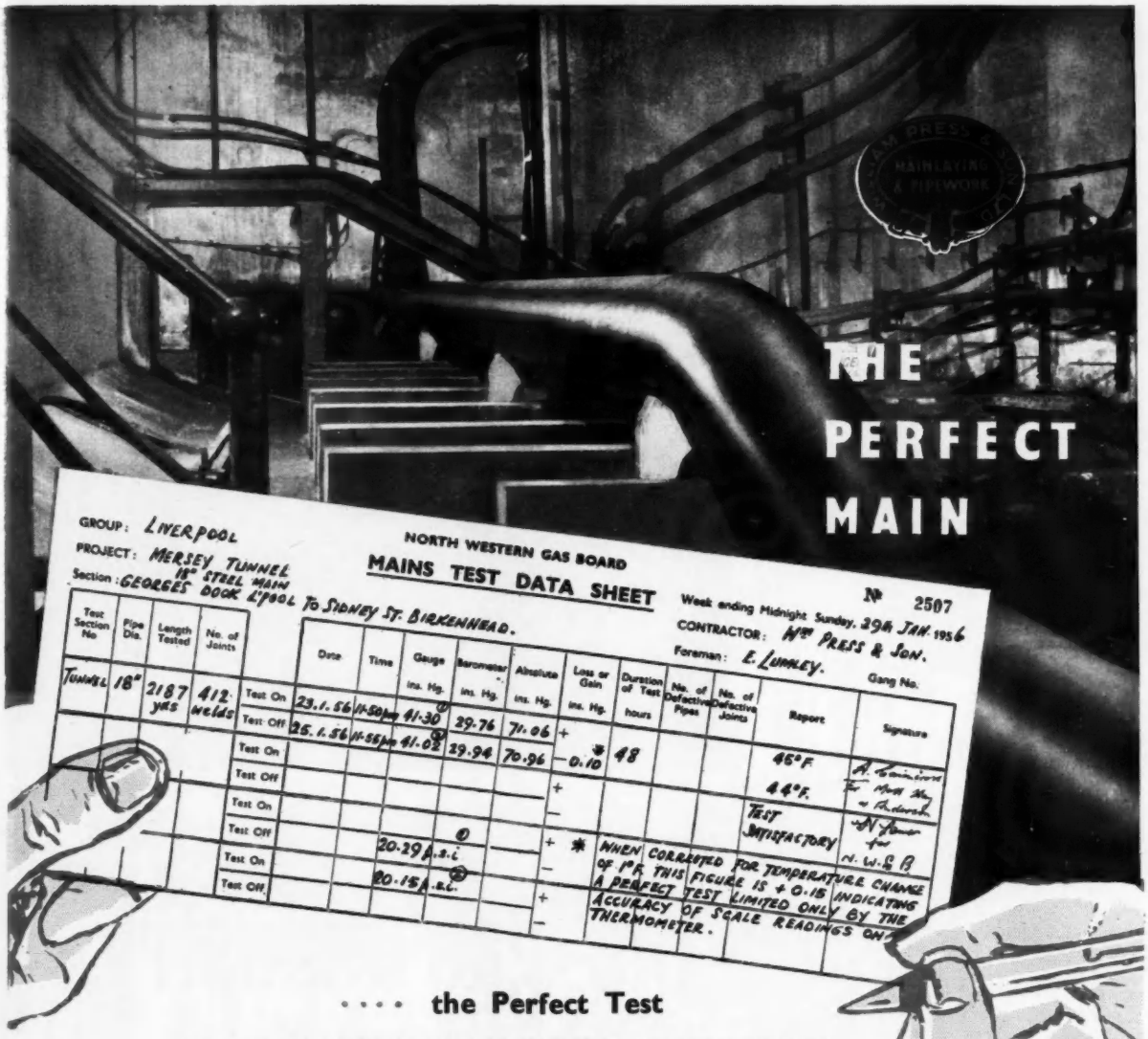
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№ 2507
Week ending Midnight Sunday, 29th JAN. 1956
CONTRACTOR: Wm PRESS & SON.
Foreman: E. LUMLEY.
Gang No.
Test Section No | Pipe Dia. | Length Tested | No. of Joints | | Date | Time | Gauge ins. Hg. | Barometer ins. Hg. | Absolute ins. Hg. | Loss or Gain ins. Hg. | Duration of Test hours | No. of Defective Pipes | No. of Defective Joints | Report | Signature
Tunnel | 18" | 2187 yds | 412 welds | Test On | 23.1.56 | 11.50pm | 41.30 | 29.76 | 71.06 | + | | | | |
Test Off | 25.1.56 | 11.58pm | 41.02 | 29.94 | 70.96 | − 0.10 | 48 | | | 46°F. 44°F. | A. Lumley for Mott Hay & Anderson
Test On
Test Off
Test On
Test Off | 20.29 A.S.L. | + * | WHEN CORRECTED FOR TEMPERATURE CHANGE OF 1°F. THIS FIGURE IS + 0.15 INDICATING A PERFECT TEST LIMITED ONLY BY THE ACCURACY OF SCALE READINGS ON THERMOMETER. | TEST SATISFACTORY | N. Turner for N.W.G.B.
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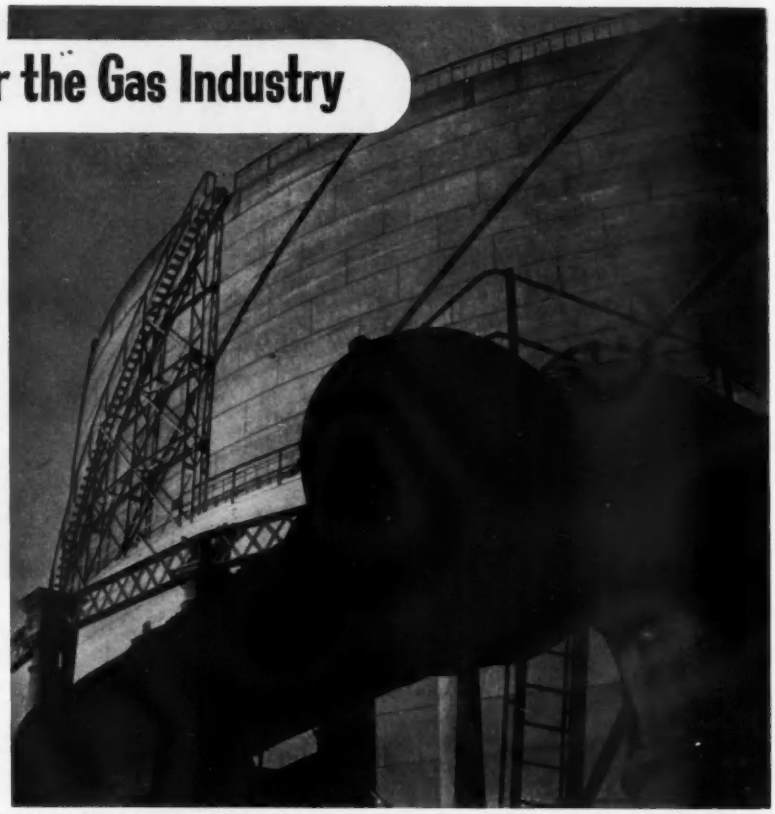

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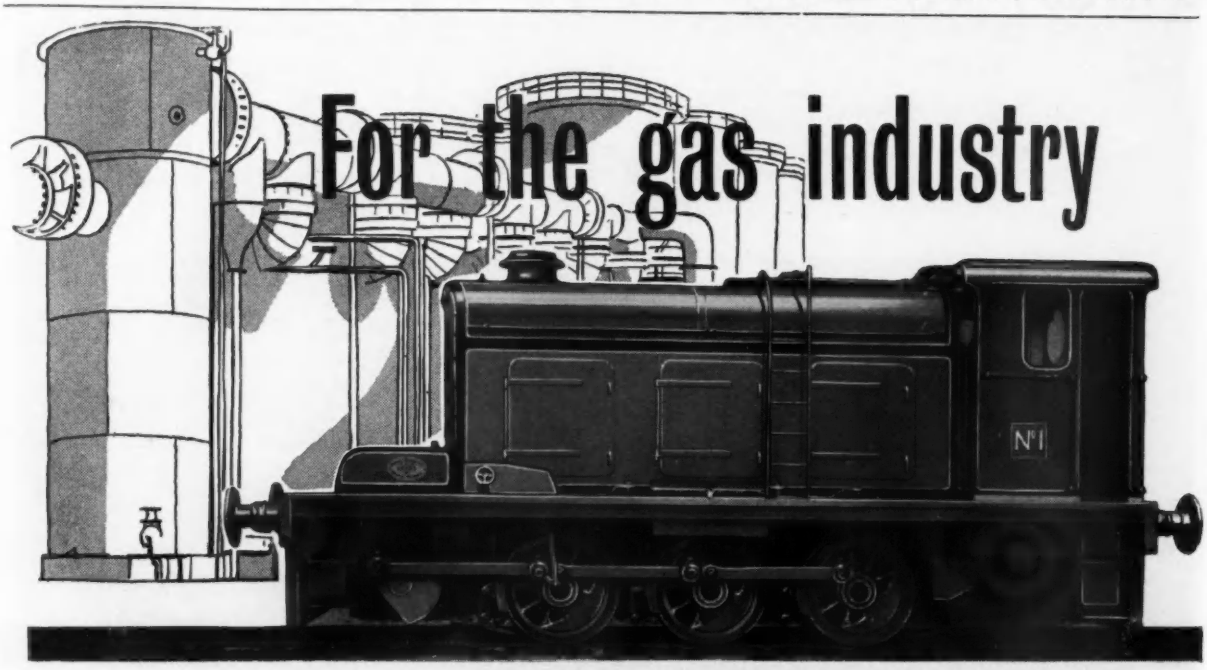

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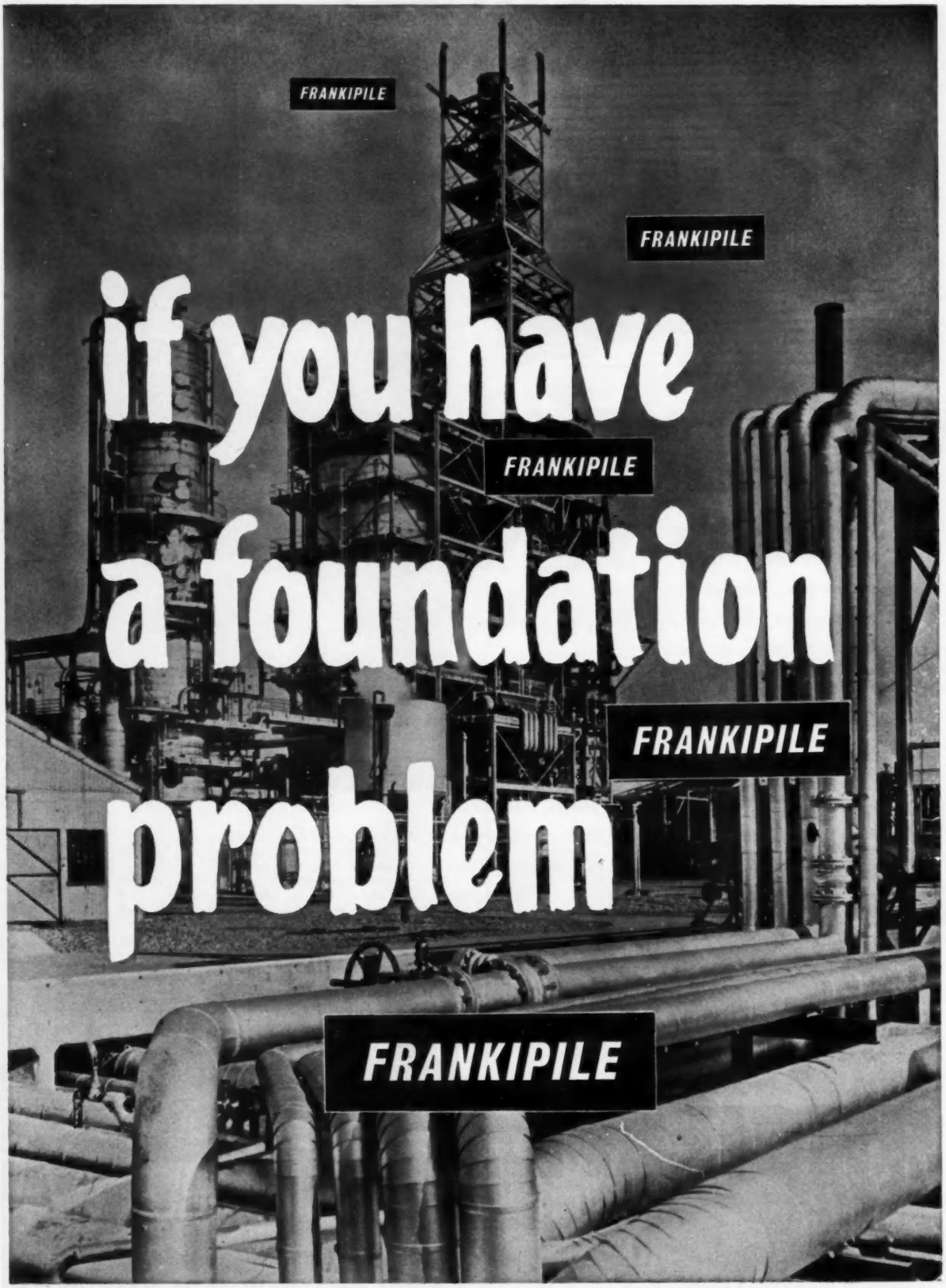

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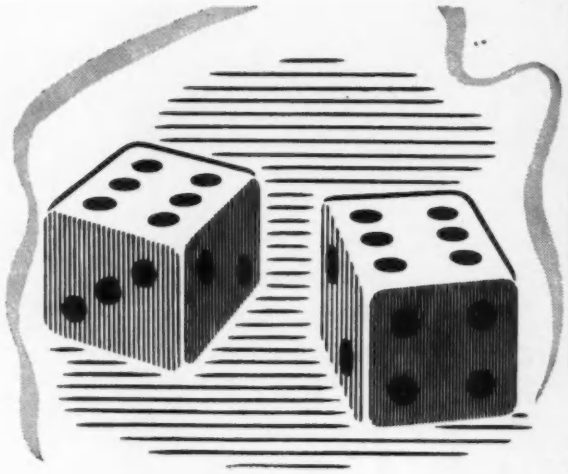

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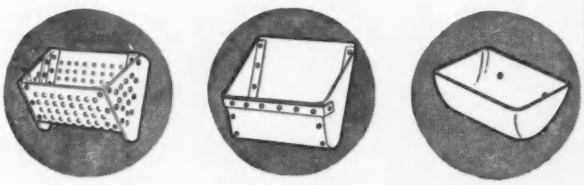

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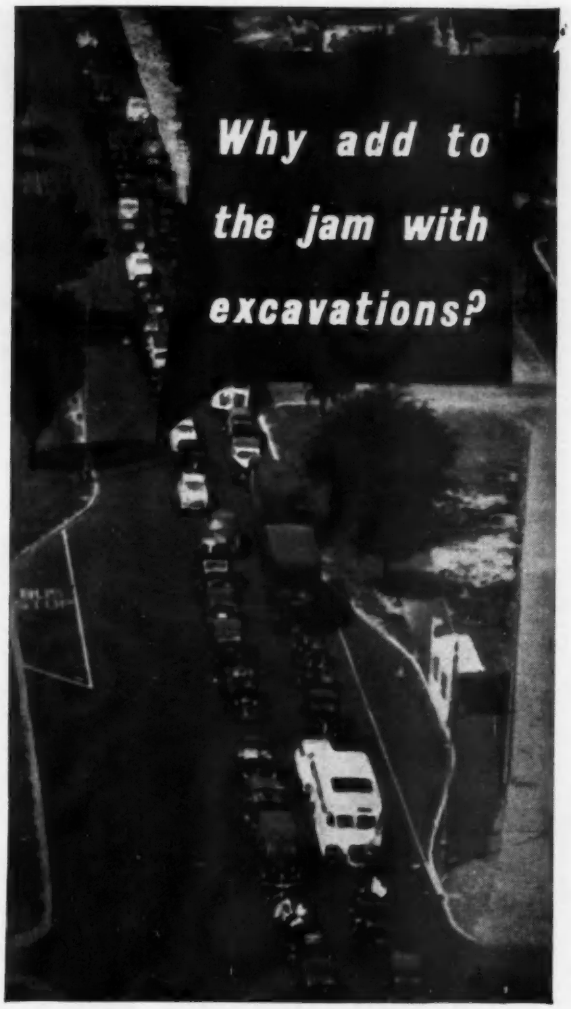

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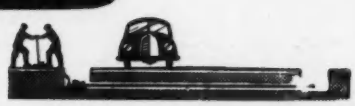

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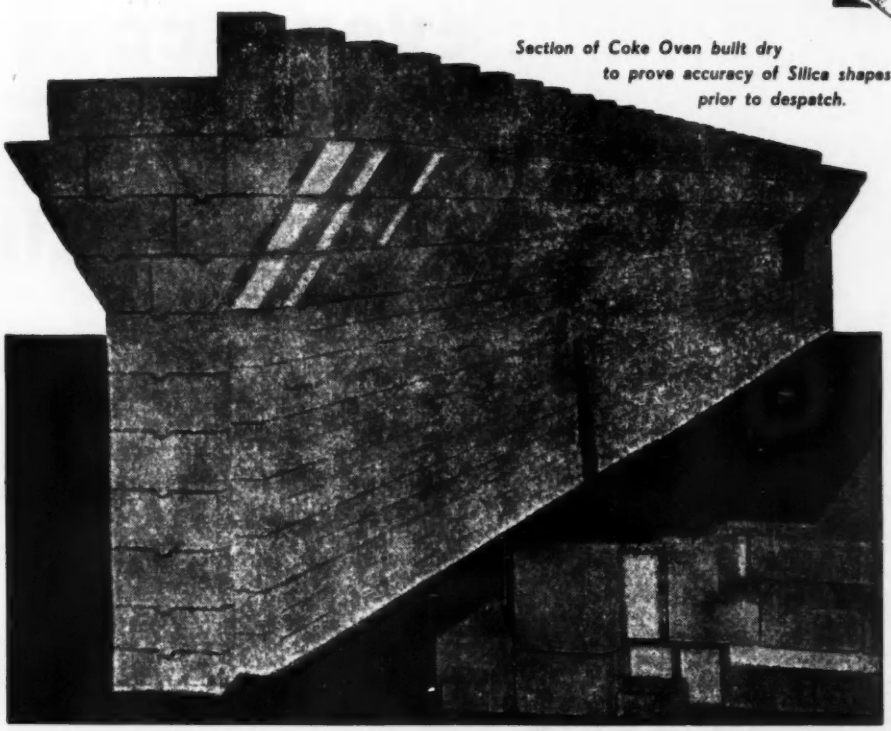

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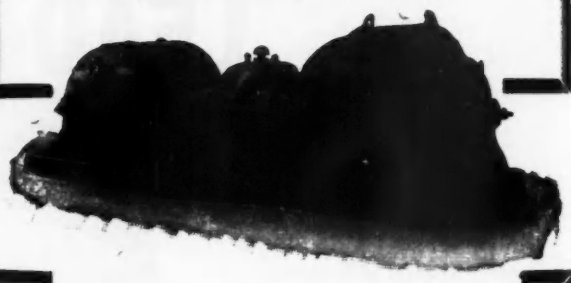

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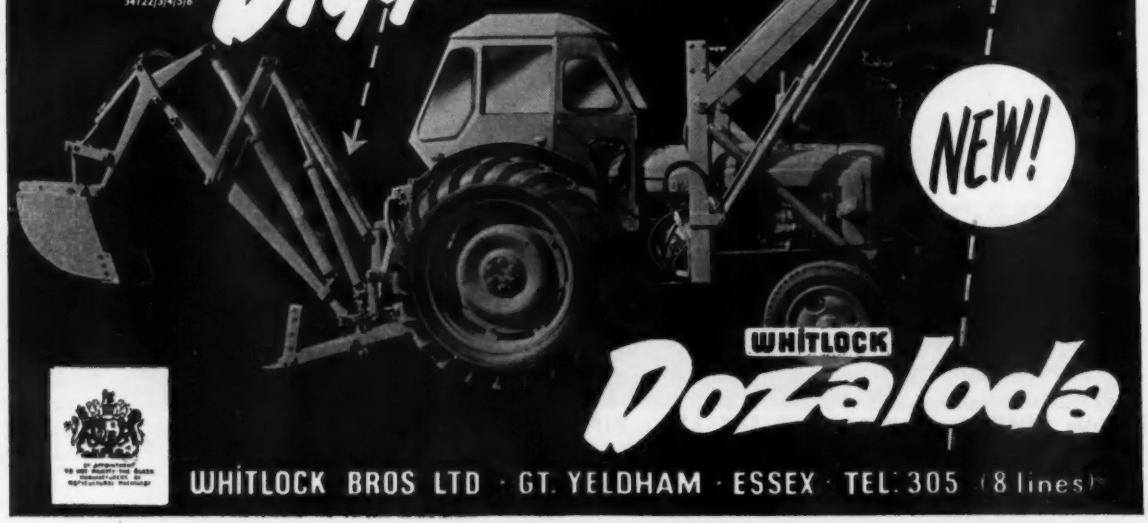

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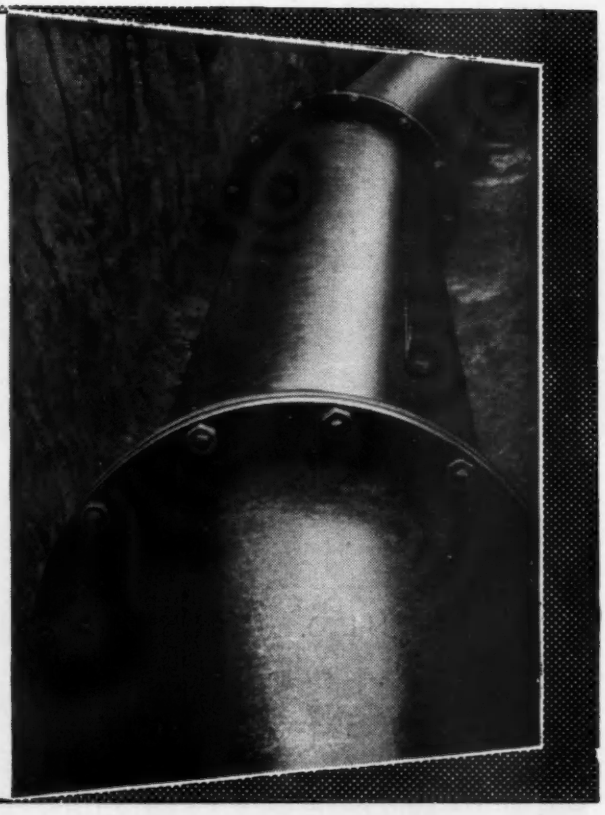

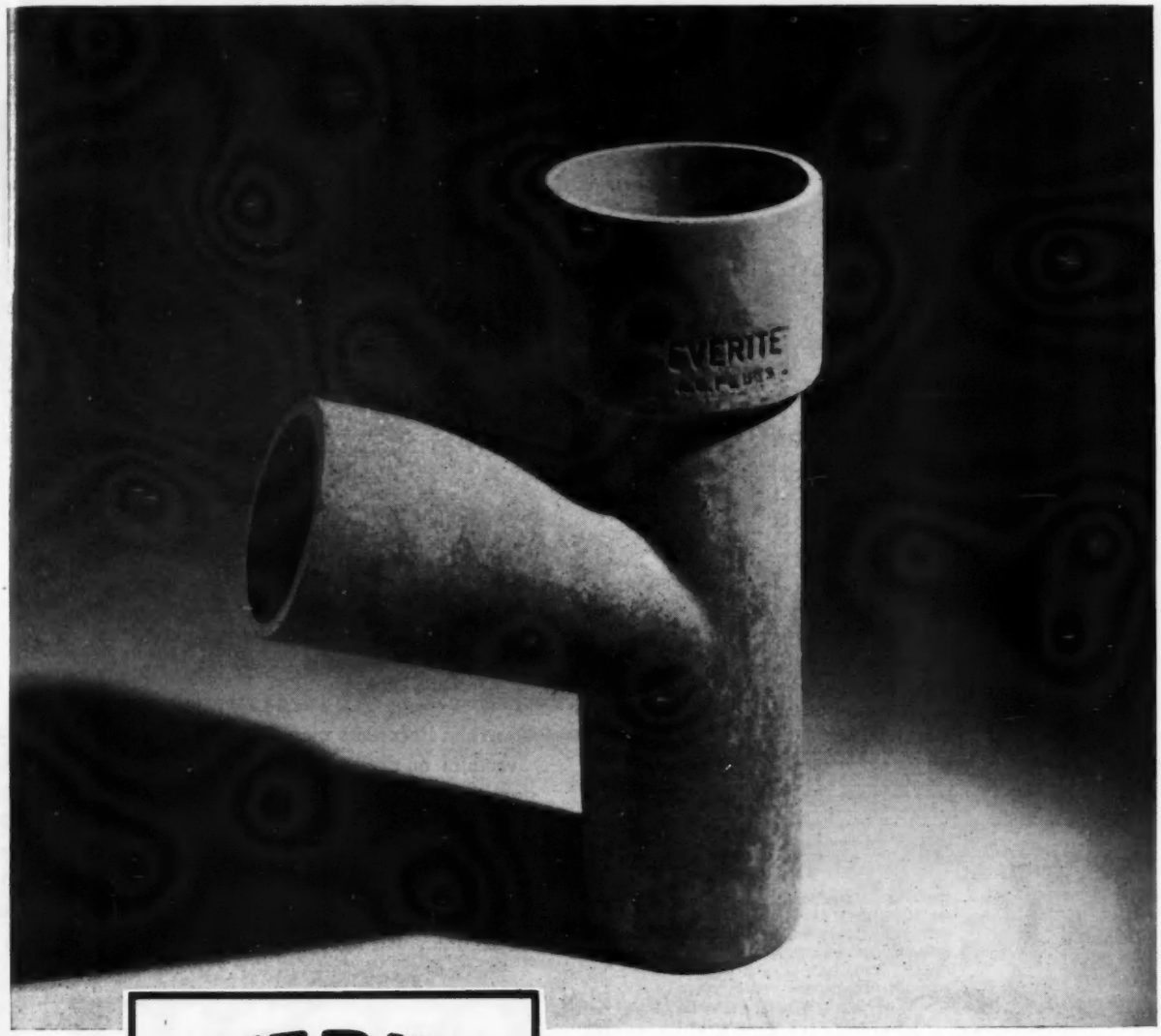

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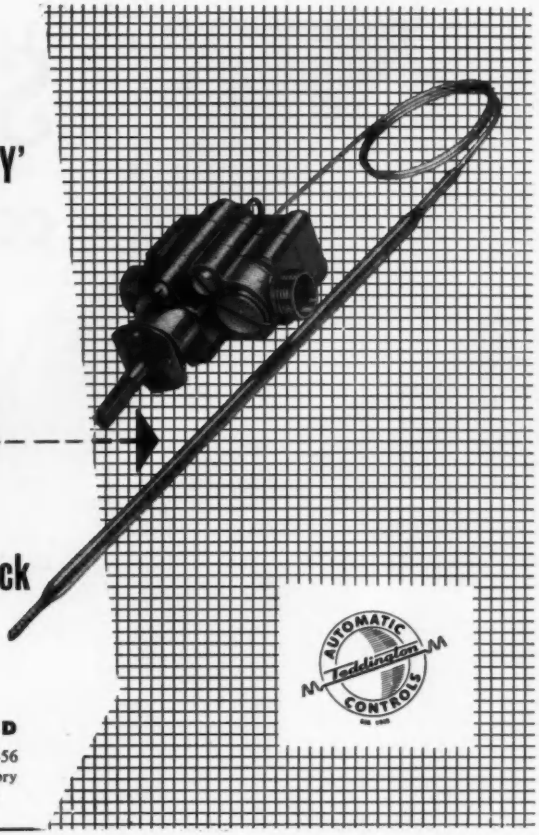

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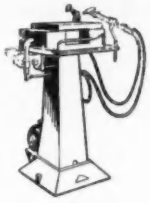

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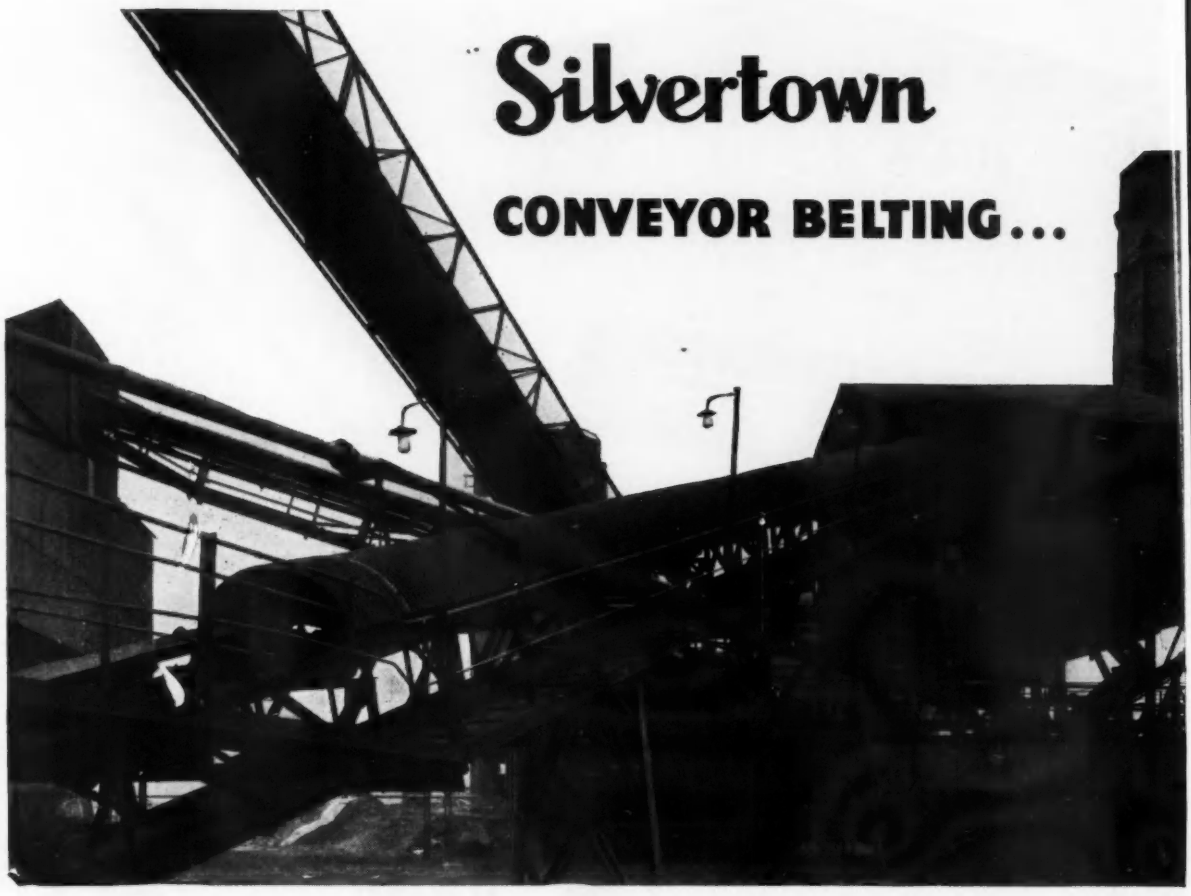

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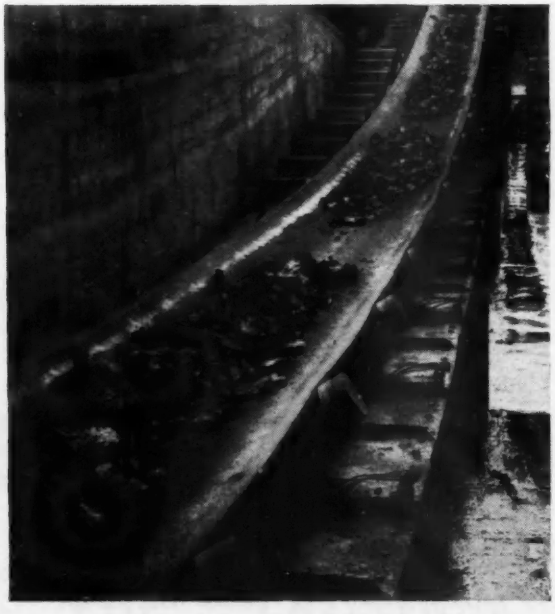

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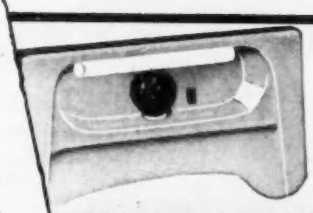

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Gas Journal

VOL. 288 NO. 4868 October 31, 1956

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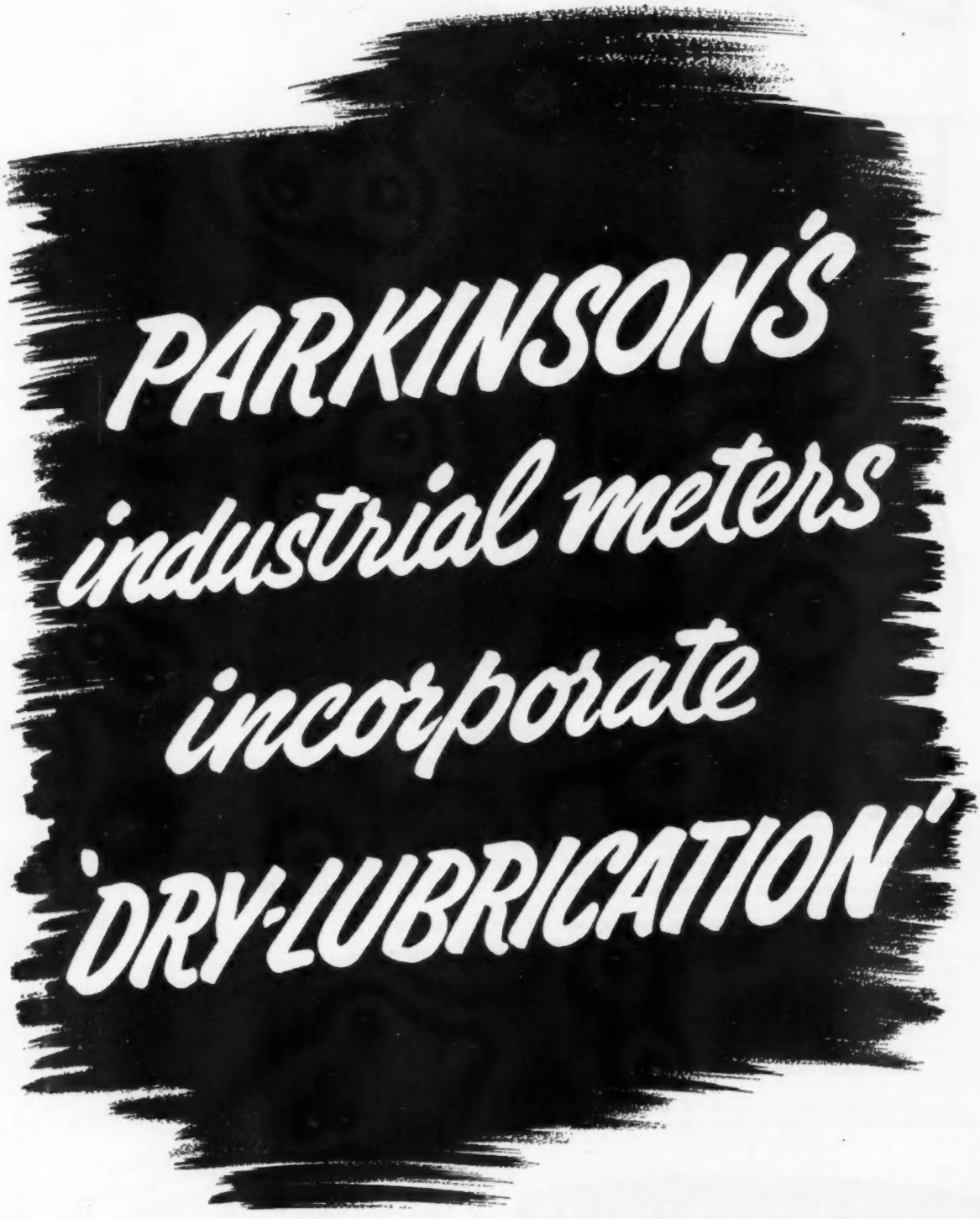
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Gas Journal

VOLUME 288. No. 4868. OCTOBER 31, 1956. 108th YEAR

Future Trends in Carbonising Industries

WE have read Dr. Arthur Marsden's farewell address to the South Western Section of the Institution with interest. In this address, which Dr. Marsden has called 'An Interim Survey,' he has reviewed the state of the gas industry as he sees it at the moment and the direction to which, in his opinion, it is moving.

Dr. Marsden first stresses the need for improvement in the thermal efficiency of carbonisation. Even the 75% efficiency which, at any rate in the smaller works, we thought so good a few years ago, must be improved on. The aim must be to improve this to something nearer 90%, which is quite overwhelming compared to the 30% efficiency or a little higher, being attained in the electricity generating industry.

To improve on the thermal efficiency, one of the first aims must be to raise the amount of coke for sale per ton of coal carbonised. This must be looked on as equally important as the gaseous thermal yield. A start is being made in this direction in the new works that have been commissioned this year, two of which we have described in detail in the 'GAS JOURNAL,' namely, Denton and Exeter. At these two works thermal integration is being accomplished, and no power is being imported from outside to run prime movers. It is true that electrical power is connected but this is only to enable the works to *export surplus power* to the grid or to be able to draw from it in an emergency. At Denton where dedusted breeze is used for generating producer gas no coke is used in the works at all except for retort filling after scurfing. At Exeter, where step grate producers are used, a comparatively small amount of large coke will be needed in the retort house. Dr. Marsden is prepared to go further and suggest that, as the efficiency of carbonisation is of such paramount importance, non-base load works should be worked at optimum output continuously and any surplus gas should be burnt for retort heating. This will keep the coke output constant, but at the same time the relative prices of coal, coke, and gas must be maintained to make such a procedure economically possible. The types of coal available for gasmaking or carbonising, generally, are fast changing and the suitability of such coals is becoming less; but there appear to be several ways open for the use of coals which fall into the 700-900 groups. These coals can be mixed with strongly caking coals to produce a blend that would form a suitable coke, or a satisfactory fuel may be made by briquetting into small ovoids and treatment by the new fluidising process now being worked out by the N.C.B., or thirdly, complete gasification may be resorted to.

The chief disadvantage of blending coals from the gas industry's point of view is the great expense involved in the conveyor systems and the storage bunkers needed, as well as the need of a really reliable means of finally mixing the constituent coals. This generally involves reasonably fine grinding which makes the coal unsuitable for use in continuous vertical retorts where segregation is very likely to take place and the movement of the change is prevented. From the housewife's point of view such coke as would result would be free from 'flying shale' as the ash would be uniformly distributed throughout the lump. The manufacture of ovoids is receiving a good deal of attention but mostly outside the gas industry, though research work is in progress and results are undoubtedly being obtained. Two area boards, the North Western and the North Thames, have, however, lately brought to success two forms of open fire fuel, though not as ovoids. Dr. Marsden has a high opinion of the complete gasification process and mentions the building of such a plant at Gloucester, of the Gaz Intégral type, with the retort superimposed on a water gas generator. This type of plant yields a gas of about 340 B.Th.U. per cu.ft. and can be used as an excellent diluent for high C.V. gas, whether from some other form of gas carbonising plant (perhaps from horizontals), or from some other form of gasmaking, but the final solution to the complete gasification process may be the use of the Lurgi process suitably adapted.

Much work has been carried out on this process by the Gas Council, and the discovery of methane production in the course of gasification does away with the need of upgrading for use as town gas. The use of oil, Dr. Marsden stresses, is becoming of the utmost importance, but oil must be gasified as an end in itself and not as a means of enriching blue water gas. The oil industry is fast superceding the carbonising industry as a source of chemical raw materials. Coal, therefore, must be looked at in a new light, and only its most important by-products, gas and coke, should be considered as fuels. Coal is a source of chemical raw material, not a fuel.

Gas Liquor as a Weed Control

MOST encouraging trials have been carried out by the N.A.A.S. in Wiltshire using gas liquor for weed control on kale. It is well known that liquor has certain weed controlling properties, which have been clearly demonstrated in the course of its use as a nitrogenous fertilizer for grassland. The drawback of its more specific adoption for this purpose, however, has been the method of application—that is, the fact that to save undue loss of free ammonia it has to be trickled on to the ground rather than sprayed. By fitting a splashboard beneath the nozzles of the spraybar it has proved a simple matter to convert the individual flows into a more or less continuous curtain of liquid, thus giving complete coverage of the crop.

In the Wiltshire experiments quite remarkable results have been obtained, amounting on some of the trial plots to virtual extermination of all weeds with little or no setback to the kale. There is, of course, some initial check to growth, but this is less severe than when sulphuric acid is used for weed control. Varying rates and methods of application have been tried, but it seems that the ordinary (fertilizer) rate of 330 to 400 gal. to the acre is completely effective. At this rate, the application is no more expensive than sulphuric acid, markedly cheaper than certain proprietary brands of selective weed-killer, and provides at the same time a useful dressing of nitrogen for the kale. On the other hand, it should not be assumed that the crop is getting the full advantage of all the nitrogen available in the gas liquor, since some must be expended in the job of killing the weeds and never reaches the ground.

While the crop weights and values from the trial plots still remain to be determined before a final assessment of the experiments can be reached, there would seem to be no question that a new and valuable application has been discovered for gas liquor. It would be interesting to know precisely what elements in the liquor produce this lethal effect and whether all types of liquor are likely to operate in the same way.

A Century of Steel

ON August 11, 1856, Henry Bessemer told of a new process of making steel. What a momentous announcement it must have been, but how many realised at the time how great the possibilities would be with the greatly extended use of steel.

The smelting of iron involves the deoxydising of the iron ore by carbon in the presence of a fluxing agent. The effect is to form a slag containing the oxygen and the other impurities in the ore such as silicon. If the temperatures are sufficiently high both the iron and the slag will be in the liquid state, and as neither is soluble in the other the two liquids can be run off independently. The pig iron so formed still contains a good many impurities, notably free carbon, as anyone knows who has worked in cast iron. In the puddling process this carbon is extracted by stirring or rabbling the molten pig iron with other metallic oxides. As the carbon was oxidised the consistency of the iron became more viscous and its purity increased. This process was extremely slow, so Bessemer, who was essentially an engineer, proposed blowing air into the bottom of the furnace. This had the effect of speeding up the reaction by nearly 1,000 times, and the process was cheap, since the cost of oxygen was the cost of running the air blower. Thus the impurities were oxidised and the mass vigorously stirred at the same time.

But Bessemer had to fall back on the metallurgical chemists of his day for the process to be completely successful since it soon became apparent that different irons behaved differently and some of the steel made was useless. It took Gilchrist Thomas, working with his cousin Gilchrist, nearly ten years to work out the final details. The trouble was found to be caused by phosphorus present in the steel which made it unworkable, and to get rid of this phosphorus, Thomas and Gilchrist found that by introducing lime into the furnace, the phosphorus present, after oxidation, was absorbed.

The effect of being able to make steel cheaply was tremendous, and we in the middle twentieth century have difficulty in realising how great the effect must have been. The puddling furnace was both slow and very arduous to operate, and the metal so formed was really wrought iron and not steel as we know it today. It could be used for fabricating parts for machinery but as it had much lower tensile and sheering strength than mild steel, such parts had to be far more cumbersome than would be considered necessary today, the metal was much softer and tended to have a laminated structure which made it difficult to work to fine limits.

The machines wore out more quickly and were incapable of taking heavy overloads for short periods. But when the new steel came in, engineers were more than a little doubtful how much better it would be and it was some years before the railways, which were just old enough to be feeling their feet and past the pioneering days, took to this new material, principally perhaps because it was as yet anything but standard in quality. During the last 100 years then, the discovery of cheap steel, its manufacture on a vast scale, the development of its metallurgy, has perhaps had as great an effect as any other single factor on our standards of life, our ideas of comfort, or on the realisation of the dreams of some of our greatest engineers.

An Author in our Midst

IS there an author in the house? Yes, there is, in Gas Industry House—sorry, *Murdoch* House. Brian Hill, Publications Officer to the Gas Council has just had his second book published and although the 'GAS JOURNAL' is not a vehicle for literary criticism the gas industry has made such a small contribution to the arts that we feel some comment is due. The first book, a skilful and penetrating translation of Rimbaud's poems, hinted at the sensitivity of Mr. Hill's poetic palate. This new volume, an anthology of prose and verse called *Pleasure Garden* is much more revealing. It reflects a connoisseur's taste for gentle eccentricity and is made up of treasures culled from an unusually varied browsing, primarily through 17th and 18th century works and *belles lettres*. The book is well named for this is an intensely personal pleasure garden in which Mr. Hill flits deftly from the exotic orchid to the humble daisy, from Michel Montaigne to a music hall song, and finds here a note on the bad effects of childlessness and there a testament to the miraculous powers of Madeira for reviving aged parents. Published by Rupert Hart-Davis at 9s. 6d. this would make a Christmas gift acceptable to all who have a taste for literary oddities.

Although the author quotes 'A man who marries a whore may be said to rob the public,' it can be said that a publications officer who produces such an anthology in no way robs the gas industry; on the contrary he lends it a certain distinction. And here let us warn readers that although, as we hope, the book may provide the author with a liberal supply of jam, no reference is made to the industry which provides him with his bread and butter. Unless perhaps he had the South Coast in mind when he quoted this schoolboy gem:

'I went on the beach
'And I saw Mr. Leach
'He had a sun cap on his head
'I sed do you like the beach Mr. Leach
'It is better than nothing he sed.'

Personal Notes

MR. C. T. PRICE, M.B.E., M.C., Engineer to the East Surrey Division of the South Eastern Gas Board, retires today. This brings to a close 188 years' service which his family have given to the gas industry. This began in 1851 when Edward Price built and later managed Hampton Court gasworks. W. E. Price, a son of Edward, succeeded his father and served actively from 1876 to 1922. It is of interest to recall that Mr. W. E. Price became a Member of the Southern Association of Gas Engineers in 1879 and was President in 1902. He joined with others in the foundation of the B.C.G.A. in 1916. He was elected Hon. Secretary of the Institution of Gas Engineers at its jubilee meeting in 1913 and served in this office with 22 Presidents before retiring in 1936. All members of the family were responsible for many inventions and developments which added to the technical advance of the gas industry. Mr. Price himself was a gas engineering student under Mr. Alwyne Meade and Mr. Arthur Valon. From 1909 to 1911, he was Junior Technical Assistant, Walton-on-Thames and Weybridge Gas Company; 1911 to 1914, Technical Assistant, Hampton Court Gas Company. In 1914 he enlisted in the East Surrey Regiment, and the following year was commissioned to the Special Reserve of Officers and posted to 3rd Battn. The Norfolk Regiment. From 1916 to 1919 he served with the 2nd Battn. The Norfolk Regiment in Mesopotamia, and was awarded the Military Cross and Mentioned in Despatches. In 1920 he returned to Hampton Court Gas Company as Technical Assistant, and in 1922 was appointed Engineer and Manager, becoming Engineer and General Manager in 1936. In 1945, he was appointed a Director of the Company. For many years he was a member of the Southern Regional Joint Industrial Council, the London Coke Committee, and other technical bodies. In May, 1949, he was appointed Deputy Engineer and Principal Officer, West Surrey Division, South Eastern Gas Board, becoming Engineer and Principal Officer, East Surrey Division, South Eastern Gas Board, the following July. He was a member of the South Eastern Area Gas Industrial Council from its formation in 1949 until 1954. In 1922 he was elected a member of the Institution of Gas Engineers and of the Southern Association of Gas Engineers and Managers; in 1953 he was elected a member of the Institute of Fuel, and in 1953 was appointed a Member of the Order of the British Empire.

MR. W. HODKINSON, O.B.E., has been appointed Deputy Chairman of the North Western Gas Board in succession to the late Mr. A. Henshall. Mr. Hodkinson is the Chief Technical and Planning Officer of the Board. He was formerly General Manager of the United Kingdom Gas Corporation.

MR. H. W. AVIS is this year's holder of the Gas Council Challenge Trophy, awarded by the Council to the winner of the gas salesmen's circles competition, for the best paper given at a circle during the year. Mr. Avis, who is 46 and lives at Crawley, is senior District Representative of the South Eastern Gas Board at Caterham, Surrey, and won the award for his paper, 'The Selling Game.' In addition to winning the challenge trophy he receives a prize of £5 5s. from the Board for the best paper received from those submitted by the sales discussion group of each of the South Eastern Gas Board divisions.

MR. J. A. SWAIN has relinquished the post of Sales Manager of the Incandescent Heat Co., Ltd., on his appointment as Chief Engineer of the Equiverse sales division which has been specially created to deal with home and overseas orders and enquiries for furnaces incorporating the Equiverse system of scale free heating. MR. H. C. NEWMAN has relinquished his post of Manager of the group export division to take up Management of the Incandescent Heat Company's general sales division. MR. G. C. A. SMITH has been appointed Manager of the export division for the Incandescent group of companies.

MR. JOHN C. IRMINGER, General Manager of Bergen gasworks, Norway, has retired after 50 years' service in the gas industry. Mr. Irminger began work in the gas industry in Buenos Aires in 1906 at the age of 24. He trained in Copenhagen and passed his engineers' examination in England. Since 1919 he has been an energetic General Manager of Bergen gasworks, and has supervised the foundation of new gasworks in Sweden, Canada, and the United States of America on behalf of an English firm.

MR. L. F. RANDALL has been appointed Commercial Manager of the East Midlands Gas Board. Mr. Randall is at present the Deputy Commercial Manager of the South Eastern Gas Board. He succeeds MR. H. R. HART who has been appointed General Manager of the Glasgow Division of the Scottish Board. Mr. Randall is expected to take up his new appointment toward the end of this year or the beginning of next.

DR. W. L. PATRICK, General Manager of the Doncaster works of Pilkington Bros., Ltd., has been appointed a local Director of the company. Dr. Patrick, who studied chemistry and chemical technology at the Royal College of Science, London University, and later carried out research work and advanced study at Toronto University, joined Pilkington Bros., in 1938, was appointed assistant Works Manager at Plate Works in 1942, acting Manager in 1949, and General Manager of the Doncaster works in 1952.

MR. R. S. MARTIN and MISS D. JOHNSON have been appointed Joint Secretaries of Parnall (Yate), Ltd., and Ascot Gas Water Heaters, Ltd., with effect from November 1, following the departure of MR. J. MACKIE to join the Board of Parnall (Australia) Pty., Ltd.

MR. NORMAN MCKINNON WOOD, Managing Director of Griffin & George, Ltd., laboratory furnishers, and Chairman of the British Laboratory Ware Association, sailed from Liverpool last week on a business visit to the United States.

MR. PETER SCOTT ROBINSON, of 22, Clarke Street, Market Harborough, Leics., has been appointed to succeed MR. V. C. BATEMAN as local Superintendent at Market Harborough for the East Midlands Gas Board. Mr. Bateman has taken up a new appointment.

Obituary

MR. JAMES HENRY WILKINSON, aged 53, gas engineer, of 1, Ireland Bridge, Bingley, collapsed and died while boarding a bus in Keighley bus station.

Diary

October 31.—NORTH WESTERN FUEL LUNCHEON CLUB A.G.M.: Engineers' Club, Albert Square, Manchester, 2. 1.30 p.m.

October 31.—INSTITUTE OF FUEL: Institution of Civil Engineers, Great George Street, London, S.W.1. 5.30 p.m.

November 2.—JUNIOR INSTITUTION OF ENGINEERS: Pepys House, 14, Rochester Row, Westminster, S.W.1. 7.0 p.m. Film Evening.

November 6.—SOUTH EASTERN G.C.C.: 709, Old Kent Road, S.E.15. 2.15 p.m.

November 6.—EAST MIDLANDS G.C.C.: Nottingham Chamber of Commerce, Smithy Row, Nottingham. 11.30 a.m.

November 7.—BRITISH COKE RESEARCH ASSOCIATION: Institute of Gas Engineers and the Coke Oven Managers' Association, Assembly Hall, Church House, Westminster, S.W.1. 2.30 p.m.

November 7.—MIDLAND JUNIORS (Joint meeting with the Wolverhampton and District Engineering Society): Staff Mess Room, West Midlands Gas Board, Birmingham District, Council House, Birmingham. 7.30 p.m.

Engineers to Hold Clean Air Conference

AIM IS TO CLARIFY ACTIONS REQUIRED BY NEW STATUTE

SOME fifteen papers will be read and discussed at a conference on the 'Mechanical Engineer's Contribution to Clean Air,' to be held in the Central Hall, Westminster, under the auspices of the Institution of Mechanical Engineers next February.

The authors of the papers will all be acknowledged specialists in their own spheres of activity and it is hoped that the outcome of the conference will be to clarify the actions which will be necessary for mechanical engineers to take to fulfil the requirements of the Clean Air Act.

Four Sessions

This conference on the Mechanical Engineer's Contribution to Clean Air—'M.E.C.C.A.' for short—will occupy two full days (four sessions) and will be preceded by an opening evening address by a leading figure in the country's industrial life.

Other institutions and societies are being invited to the conference in order to get the widest possible coverage of the subject under review and, in particular, members of the Institute of Fuel are expected to provide some valuable contributions to the discussion, the Institution of Mechanical Engineers states.

Registration forms for attendance at the conference will be issued in the October number of the Institution's journal—the *Chartered Mechanical Engineer.*

CATERING PANEL VISITS WALES

The Gas Council's catering panel held a meeting recently at Llandudno, in the area of the Wales Gas Board. The panel, of which Mr. A. V. Horsfall (Sales and Service Manager of the West Midlands Gas Board) is the Chairman, were entertained to lunch along with the school meals organisers from the Counties of Denbigh, Flint, Caernarvon and Anglesey, at the Hotel and Catering School, Llandudno. The Luncheon was presided over by Mr. T. Mervyn Jones, Chairman of the Wales Gas Board.

Gas Ousts Electricity

Where possible gas is to be used instead of electricity in Oxfordshire school kitchens. The Canteens and Equipments Board report that fuel costs of kitchens cooking and heating water by electricity are 50% higher than those of comparable kitchens using gas.

Mr. Oswald P. Cronshaw, Chairman and Convener, Clwyd and Deeside Group, Wales Gas Board, who attended an Investiture at Buckingham Palace on October 23, to receive the M.B.E., outside Buckingham Palace with his wife and daughter.

POLICE PILLAR EXPLODES IN MARKET PLACE

AN iron police pillar, with a glass 'lighthouse' top, blew up at night in the Market Place, Shipley, Yorks, last week, when a police officer made a telephone call from police headquarters to the pillar.

As soon as contact was made between the pillar and the headquarters' switchboard there was a flash and a loud bang as the pillar disintegrated, sending metal fragments flying in all directions. The base of the pillar was uprooted and the paving torn up.

It is believed that the explosion was due to gas escaping underground and being ignited by the electricity serving the pillar.

Miners to Lose Coal Concession

MINERS who have moved to the Coltness housing estate of Wishaw, Scotland, will lose their cheap coal concession. Their new homes are in a smokeless zone. Tenants going into new houses must give an undertaking to burn coke.

Unions are protesting. One official said that while they favoured the smokeless zone idea, they felt their members should not lose the concession.

STEPS TAKEN TO IMPLEMENT ACT IN SCOTLAND

A CLEAN Air Council has been formed in Scotland to supervise the implementation of the Act and to make recommendations to the Department of Health, Sir Patrick Dollan told a recent meeting of the Scottish Fuel Efficiency Committee in Glasgow.

Local authorities are going ahead with plans for smoke-free areas, and in one large Glasgow housing scheme no coal burning fires are to be installed; a number of industrial firms have also made alterations to their plants, in some instances involving considerable expense.

New Appliance Drive

The Scottish Gas Board launched a drive in the Hawick area recently to demonstrate new appliances. A highlight of the show were cookery demonstrations by M. Henri Malet, for many years chef de cuisine at the Grosvenor House, as well as by Miss I. C. Copland and Miss J. Bissett, of the S.G.B.

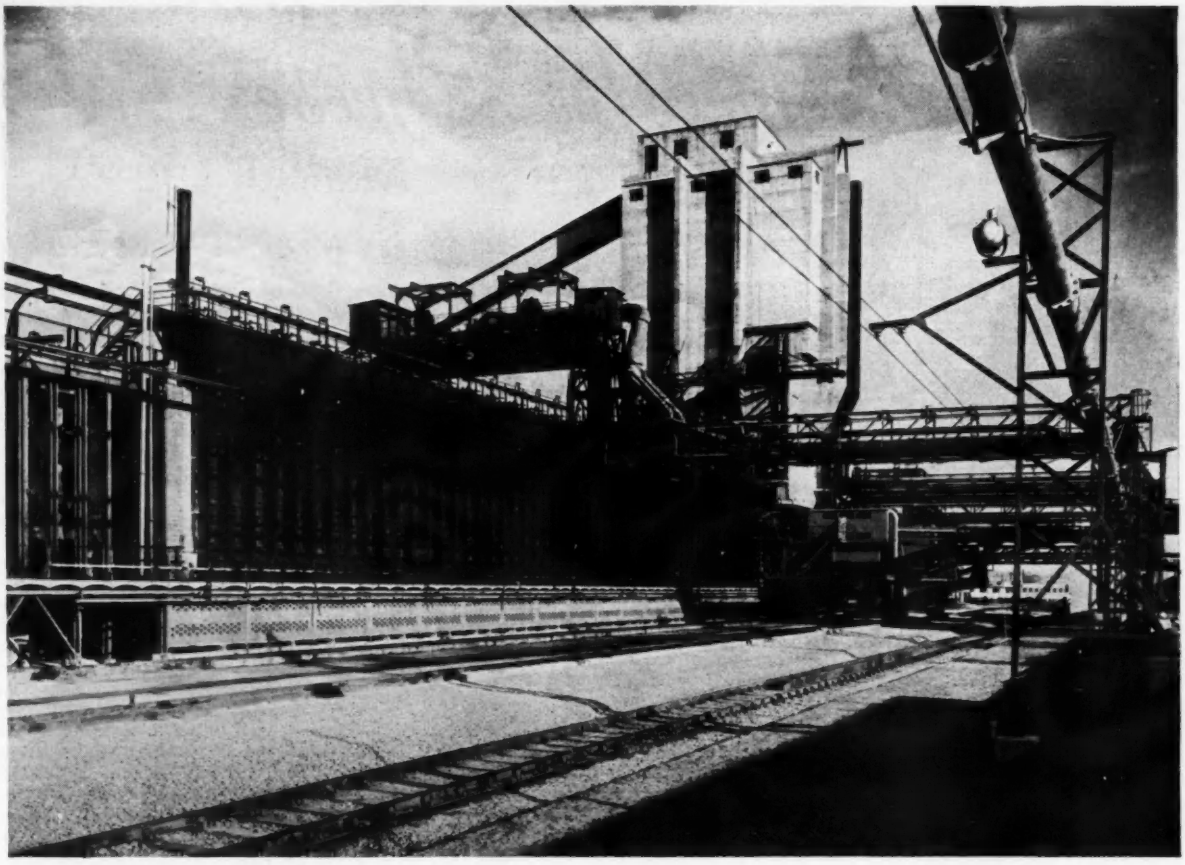
Leading appliance manufacturers supported the show with special stands, among them Flavel, Main, Ascot, Morley, and Forth and Clyde.

BIGGEST COKE OVEN BATTERY IS LIGHTED

Dorman Long & Co. Ltd., have lighted a new battery of 150 coke ovens at their works at South Bank-on-Tees. The battery is the largest in Britain, and has been built by Simon-Carves, Ltd., Stockport. The ovens are at present being dried out, and it is expected to be another week or so before they begin production. They will produce about 15,000 tons of graded coke every week by carbonising 25,000 tons of coal. When the plant is in full operation, Dorman Long's total carbonising capacity will be 2,400,000 tons of coal a year.

Strike Fills Court

As a result of the recent strike in the Clydeside shipbuilding yards, the Small Debt Court in Glasgow had to deal with over 1,000 cases brought at the instance of the Scottish Gas Board for arrears of instalments on gas cookers, said Sir Robert Sherwood Calver, Q.C., Sheriff of Lanarkshire, at a meeting in Glasgow recently.



The Pusher Side of the North Battery after six months operation

The Avenue Carbonisation and Chemical Plant of the National Coal Board, East Midlands Division

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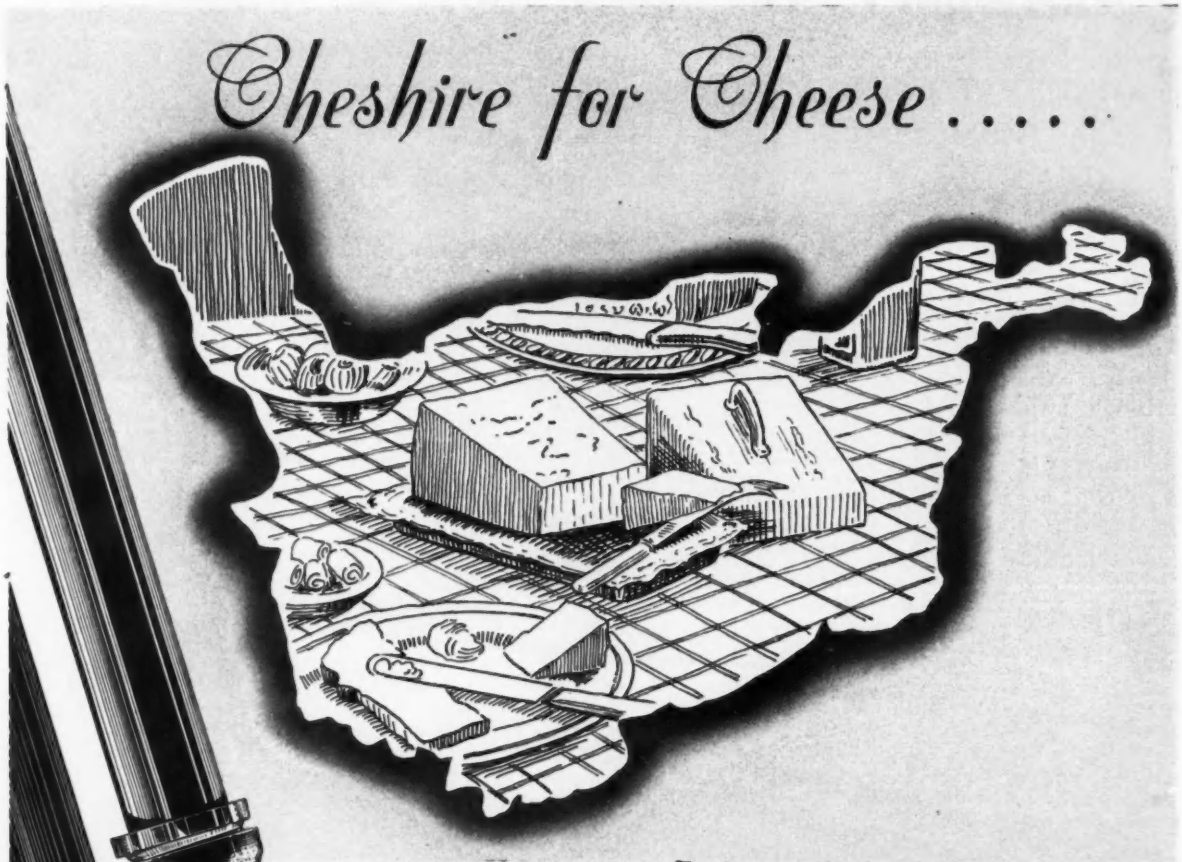

Traditional foods, like traditional skills, must always have a geographical centre. Cheshire's fame for its Cheeses is richly deserved and Cast Iron pipes and Staveley are as world famous as they are synonymous.

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SAND & METAL SPUN PIPES
(with run-lead or flexible joints)
for GAS MAINS

THE STAVELEY IRON & CHEMICAL CO. LTD. NR. CHESTERFIELD

YOU MUST SELL MORE GAS, WALES MANAGERS ARE TOLD

Decisive Talks at Aberystwyth

'THE fact that the grid has come means not rest, not peace, but a sword for managers,' the eleventh conference of chairmen and conveners of the Wales Gas Board were told at Aberystwyth last Sunday by Mr. T. Mervyn Jones, Chairman. He added, 'All the effort put into the retort house—and very much more—now has to be put into selling gas.'

Over three days the conference had decided Board policy by means of direct consultation between Board members and other chief officers, and the chairmen and conveners—as representative managers—from all parts of Wales. The Minister of Fuel and Power addressed the conference on Saturday.

Mr. Mervyn Jones, who was winding-up the conference, said: 'We have now provided the means whereby for far the the greater part of Wales, an assured, an efficient, a first-class supply of gas is available to any and every consumer. We can only possibly tolerate in the management of the undertakings where these conditions exist, persons who are determined to lend every one of their energies to the sale of that gas and all that goes with it. . . . .

'The fact that the grid has come means not rest, not peace, but a sword for managers, generally. Because its arrival puts upon the manager not less but more responsibility than he has ever had in the past.

'All the effort put into the retort house—and very much more—now has to be put into selling gas.

'"By their sales we shall know them"—that is the determined policy of the Wales Gas Board.'

Mr. Aubrey Jones, Minister of Fuel and Power, had already mentioned sales in his address the day before. He said: 'From the outset your Board have pursued a policy of integration designed to make the best use of the growing sources of bulk supply available to them.

'While there have been shortages of materials and other differences, this basic programme of development has not hitherto been frustrated or even delayed by shortage of money. You are now within sight of the completion of your major grid schemes both in North and South Wales and, as a consequence, more gas is available over a wider area and on a very much more satisfactory basis as regards pressure and quality.'

Understandably Impatient

'Having laid the foundation in this way you are understandably impatient to reap the full benefit by going out and selling gas as hard as you can. Having effectively developed your ability to supply gas you now wish to develop your sales and service. And in this you feel yourselves frustrated by the Government's restriction of hire-purchase credit; by the refusal of new borrowings to finance simple hire; and for the building of showrooms and service centres.'

Mr. Jones said he shared their disappointment in this. In the interests of fuel efficiency and of clean air alike he should like to see them go ahead. But the last thing they wanted was to see their operations financed through the mere printing of money.

The Minister went on: 'Don't forget, too, that short of immediate capital expenditure on showrooms and service centres or new borrowings to finance simple hire of appliances your freedom to go out and sell gas for all you are worth as an efficient and smokeless fuel is unimpaired.'

Speaking of the need for efficiency in top management, the Minister said that there was a great danger from the fact that the controversies and passions which surrounded nationalisation were still smouldering. So long as there was a move towards extension of public ownership beyond the present limits, so long would the business community, believing this to be wrong, seek to prove its point by maintaining a harshly critical attitude towards the industries that were already nationalised.

Artificial Gulf

An artificial gulf created between British industry and nationalised industry should be eliminated so that men of ability would be as ready to choose coal or gas as other branches of industry and to make their choice on merits and without any idea at the back of their minds that they might be putting themselves beyond the pale of industry generally.

The public seemed to regard him somehow as running the nationalised industries. And the pressures were very great on him sometimes—particularly in Parliament—to interfere in the work of those whom he appointed.

'I wish to make it perfectly plain that I do not regard myself as running the nationalised industries and the last thing I want to do is to interfere with those who do run them.

'There are certain broad duties of supervision laid on me by statute. But consistently with these broad supervisory duties I want to allow as much managerial freedom as I can. That seems to me to be a vital condition of efficiency in the nationalised industries. No large organisation would run properly if there were constant interference from the top. The whole machine would slow down; no one in the lower reaches would assume any responsibility at all; the buck would constantly be passed upwards and in the end the chap on top would break down too.

Decision

'It is that, having granted them freedom, the Minister must reach his own decision on whether or not the Board measure up to their task. If they do and all I have to do is automatically reappoint, then what a happy man I shall be!'

The Minister and his wife, who was also present, were handed mementoes of their visit by the Chairman of the Board, and four short speeches of welcome were made by officers and managers.

Aspects Covered

Officers of the Board submitted reports on various internal aspects of work, and these were circulated before the meeting, so that maximum time was allowed for those present to formulate decisions where necessary.

The following officers reported: Mr. S. L. Wright, Gas Engineer; Mr. F. Richmond, Mechanical Engineer; Mr. Richard Jones, Manager, South Wales Grid (a paper by Mr. O. P. Cronshaw, Manager of the North Wales Grid, was dealt with in his absence); Mr. W. T. Hird, Distribution Engineer; Mr. C. B. Mawer, Secretary; Mr. T. O. Jones and Mr. D. H. Griffiths, Solicitors; Mr. T. L. Davies, Industrial Relations Officer; Dr. F. G. D. Kerr (medical report); Mr. A. W. Richards, Coal, Coke and By-products Officer; Mr. T. A. Morgan, Chief Accountant; Mr. T. E. Tyrell, Domestic Sales and Service Officer (South and Mid Wales); and W. H. Tarn, Industrial and Commercial Gas Engineer.

On Friday evening there was a special showing of a film describing main-laying operations in the construction of the North Wales Grid.

Long Service

Towards the end of the conference, Mr. F. Dupont, Chairman of the Brecon and Radnor Group, was presented with a certificate by Mr. Mervyn Jones to commemorate 40 years' service by 'he who has one of the most difficult group chairman jobs in the whole of Wales.' Mr. Jones said to Mr. Dupont: 'I hope it will always remind you of the admiration in which we hold you for the work you have done in the gas industry over the years.'

Mr. A. Facer, Group Chairman, Pontypool, was presented with the Wilson Bartlett golf trophy which he won on Saturday afternoon, with a net score of 75.

AUTUMN MEETING OF THE INSTITUTION OF GAS ENGINEERS, MIDLAND SECTION, OCTOBER 12.

Safety, Health and Welfare

By D. H. BROWN, B.Sc., WEST MIDLANDS GAS BOARD.

SINCE the first effective Factories Act of 1833 and the appointment of the first four factory inspectors, there has grown up, as a result of experience, a large body of safety precautions which by law we are obliged to observe. These are embodied in the lengthy consolidating Factories Act of 1937. But the process of adding to the law still goes on and there is the amending Factories Act of 1948 as well as the many Codes of Regulations made under these Acts. We have heard recently that more regulations are in preparation and so the growth of the law continues. I do not intend to say much about these many Codes of Regulations today. There is more than enough to discuss in the Acts themselves.

A clean place of work is important. Dirt that would allow disease to breed and spread should be removed, and dust that fills the atmosphere and would enter our lungs must be suppressed.

There is too, the psychological effect. A clean works is a more cheerful place in which to live—and, after all, that is what our workpeople do for almost one-third of their lives—they live on the gasworks. The Act lays down the minimum legal standard to be maintained. 'Every factory shall be kept in a clean state' is what the Act requires. That is the general overall requirement. Then detail is given. Dirt and refuse must be removed daily from floors, benches, stairways, and passages and we should note that refuse is held to include waste material. Floors must be cleaned at least once every week. Vacuum cleaning and hosing down with water are two useful methods of cleaning.

The Act then goes into some detail on the treatment of the surface of inside walls and ceilings, etc., detailing how they must be washed down with hot water and soap if they have a smooth impervious surface or, alternatively, white or colour washed every 14 months.

Gasworks are included in the schedule of works exempted under certain conditions from the treatment we have discussed. But it should not be forgotten that there are parts of our works which are not included in the exemption, namely, the engine house, fitting shops, messrooms, cloakrooms, washrooms and sanitary conveniences.

Overcrowding and Temperature

There shall be no overcrowding such as would cause a risk of injury to the health of the people working and the Act lays it down that the volume per person must never be less than 400 cu.ft. (with certain provisos). This requirement has little application to our own industry, as it is seldom if ever that our busiest workshops ever approach this minimum standard. We must maintain a reasonable temperature but not by means that allow any injurious or offensive fume to escape into the room. Note the restriction on any fume which is offensive. And at this point, I might mention that this term fume is defined in the Factories Act as including gas or vapour. When a substantial proportion of the work is done sitting and does not involve serious physical effort then there must be a temperature of not less than 60°F. after the first hour of work. Occasionally some of our larger buildings may present some difficulty in finding an easy means of maintaining a reasonable temperature, *e.g.*—a large stores. But, in other cases, our problem is that of getting rid of heat and we must remember that a reasonable temperature is one which is not too hot as well as not being too cold.

Ventilation, Lighting and Drainage

Adequate ventilation must be provided and this must include the rendering harmless of fumes and dust that may be present due to the process being carried on. The need to provide good means of ventilation in retort houses is well known to us all. Good ventilation also helps to keep down excessive warmth.

The standard of lighting required is 5 ft. candles at the floor level over which persons pass. Additional lighting for the processes as required must also be provided. Glare is to be avoided, coming either from the light sources or reflected surfaces, and it should be noted that the formation of shadows which cause eyestrain and thus the risk of accidents, must also be avoided.

When the floor is wet, to such an extent that the water can be drained away, then drainage must be provided. Sometimes this is simply a matter of sloping the floor and fitting drainage channels, *e.g.*—the arrangement sometimes found around water softening plants.

Suitable and sufficient sanitary conveniences have to be provided and the Sanitary Accommodation Regulations lay down numbers, structural details, etc., in some detail. Regulation 5 reads

> 'every sanitary convenience shall be sufficiently ventilated and shall not communicate with any workroom except through the open air or through an intervening ventilating space.'

General Safety Provisions

Now we come to the major part of the Factories Acts. This deals with safety. The earlier sections of this part deal with prime movers, transmission machinery and other dangerous machinery. Briefly, the law may be stated thus. A prime mover must be securely fenced wherever it is, transmission machinery must be securely fenced unless it is equally safe by position or by construction, and dangerous machinery must also be securely fenced unless safe by position or construction.

We should note first, I think, that a prime mover, as defined in the Act, is an

> 'engine, motor or other appliance which provides mechanical energy derived from steam, water, wind, electricity, the combustion of fuel or other sources.'

Every flywheel directly connected to a prime mover and every moving part must be securely guarded whether it is situated in an engine house or not. I sometimes have it put to me that a motor is housed in a small separate house into which there is only occasional entry and it is suggested that the motor need not be fully guarded—but this is not so.

Next, transmission machinery is dealt with. The term means, we are told,

> 'every shaft, wheel, drum, pulleys, system of fast and loose pulleys, couplings, clutch, driving belt or other device by which the motion of a prime mover is transmitted to or received by any machine or appliance.'

It must be securely guarded unless safe by construction or position. Safe by position is the requirement that causes most trouble. If a shaft is, say, 15 ft. up in the air, it may be safe by position to someone working on the ground. But, if a worker uses a ladder to go up and attend to some item near the shaft, then it is no longer safe by position to the worker and the shaft should be guarded.

Other requirements relating to transmission machinery are the provision of appliances to cut off the power from the transmission machinery in every room or place where work is carried on. Then, too, a driving belt must not be allowed to ride on a shaft, which is part of the transmission machinery, and striking gear for the movement of belts to and from fast and loose pulleys must be provided.

Two points to note are that the striking gear must be a mechanical appliance and it must be so constructed as to prevent the driving belt creeping back on to the fast pulley.

Other Machinery

Next, we come to the provisions covering machines other than prime movers and transmission machinery. Here, the law says that every *dangerous* part of any machine must be

securely guarded except when it is safe by position or construction. If a fixed guard cannot be fitted, then an automatic guard may be used. The part of a stock-bar projecting beyond the head-stock of a lathe must be securely guarded and, finally, under this section, the Minister is empowered, if he so desires, to make regulations requiring the guarding of material or articles which are dangerous while in motion in the machine.

There is a section requiring that all fencing or other safeguards provided by the previous sections on safety be of 'substantial construction and constantly maintained and kept in position while the parts required to be fenced or safeguarded are in motion or in use.'

To meet this requirement calls for continual vigilance on the part of our supervisors, foremen and plant examiners.

Dangerous Parts: Probably one of the first questions that will come to your mind is what is meant by "dangerous" when we consider the requirement that 'every dangerous part of any machinery . . . shall be securely fenced.'

Justice Du Parcq, in the case *Walker v Bletchley Flettons Limited*, said:

> 'in considering whether machinery is dangerous, it must not be assumed that everybody will always be careful. A part of a machine is dangerous if it is a possible cause of injury to anybody acting in a way a human being may be reasonably expected to act in circumstances which may be reasonably expected to occur.'

In this connection, of course, it should be borne in mind that behaviour which is reasonably foreseeable may not be reasonable behaviour. It may be far from it. On the other hand Lord Justice Scrutton had this to say in the case *Higgins v. Harrison*

> 'of course, the machine was dangerous if you went and put your hand into it; every machine is dangerous if you go and put your hand into it whilst it is working.'

Having established the duty to fence, then we must note that the extent of the duty is to provide secure fencing, 'somewhat' secure fencing is not enough. The secure fencing which has to be provided is against contact with the dangerous parts. The fence, as we said above, is intended to keep the worker out, not to keep the machine or its products in.

One provision is that every fixed vessel, structure, sump or pit, must, if it contains any scalding, corrosive or poisonous liquid to be fenced to a height of at least 3 ft. or securely covered and, where this cannot be done, then all practicable steps are to be taken by covering, fencing, etc., to prevent an accident occurring through someone falling into the vessel.

With self-acting machines, the requirement is that there be a clear space of at least 18 in. where there is a possible trapping area between the moving part of a self-acting machine or anything that may be carried on the machine and any fixed structure.

Young Persons

Next, we have the requirement that a woman or a young person, *i.e.*—one who has not yet reached 18 years of age, must not clean a prime mover or transmission machinery while it is in motion and further, must not clean any machine which is in motion if, in doing so, he would be exposed to risk of injury from that machine or any adjacent machinery.

There is next a provision requiring training and supervision of young persons working at certain scheduled dangerous machines but this has only very limited application to our industry.

Hoists and Lifting Tackle

The requirements of the section dealing with hoists and lifts are briefly, intended to prevent the type of accident which used to take place through persons falling down the hoist well because the gates were open or, alternatively, through their being caught by some moving part of the cage and crushed against some part of the fixed structure. The required arrangement is that the gates shall be so interlocked with the operating power that it is impossible to open the gate of the cage unless the cage is opposite a particular floor. And, further, if the gate on any floor is open, the cage will not leave the floor at which it is resting at that time. It should not be possible if the hoist is, for example, at the third floor for the gates either above it or below it guarding the hoist well to be opened.

Under the main section on hoists and lifts is a general requirement which we should keep in mind. It is that

> 'every teagle opening or similar doorway used for hoisting or lowering goods or materials whether by mechanical power or otherwise shall be securely fenced and shall be provided with a secure handhold on each side of the opening or doorway.'

It is generally agreed that the fencing should be 3 ft. in height.

Now we come to the requirements where chains, ropes and lifting tackle are used for the purpose of raising or lowering persons, goods or materials. Again, these legal provisions are numerous and I do not propose to go over them in detail. But, briefly, the aim is that chains, ropes and lifting tackle should be used safely and that their condition should be safe and that the workman has a means of knowing what the safe working load is for each item and, unless made of steel, etc., that they be annealed at intervals, depending upon their size or use.

Of the detailed provisions, I would refer to two items which I feel we should watch carefully. The one is that, although a fibre rope is exempted from the initial examination before being taken into use, it is subject to the six-monthly examination with all the other items. Sometimes, these ropes are overlooked. The other requirement is the keeping of a register of chains, ropes and lifting tackle. I, personally, favour a card index register for this purpose and, if properly used, this can be most helpful in keeping a check on the items.

Next, the use of cranes and other types of lifting machine, *i.e.*—a crane, crab winch, teagle, pulley block, ginwheel, transporter or runway. Generally speaking, the aim is to ensure the safety of the parts and working gear. There is the obligation of examination every 14 months by a competent person, proper maintenance of the rails and tracks over which the crane may run, marking of the safe working load, prohibition of overloading except for the purposes of tests and the obligation of thorough examination and test on first being taken into use in a factory and, finally, there is the requirement that 'if any person is employed or working on or near the wheel track of an overhead travelling crane in any place where he would be liable to be struck by the crane, effective measures shall be taken by warning the driver of the crane or otherwise to ensure that the crane does not approach within 20 ft. of that place.'

Safe Means of Access

The next section deals with the maintenance of doors, passages and stairs and requires that all parts be of 'sound construction' and be 'properly maintained.' Staircases must have handrails and, if necessary, double handrails. Openings in the floors are to be securely fenced unless it is impracticable to do so and all ladders must be soundly constructed and properly maintained. And we have the requirement that, so far as is reasonably practicable, there shall be provided and maintained safe means of access to every place at which any person has, at any time, to work and, further, when a person has to work at a place from which he is liable to fall a distance of more than 10 ft., then, unless there are secure footholds and, where necessary, secure handholds, means shall be provided, so far as is reasonably practicable, by fencing or otherwise for ensuring his safety.

Poisonous and Explosive Substances

One section is directed against the hazards where dangerous fumes of a poisonous nature are liable to be present. These are hazards with which we are all very much concerned. The minimum size of manholes is first laid down and then it is stated that no one shall enter a confined space in which dangerous fumes are liable to be present to such an extent as to involve risk of a person being overcome by the fumes unless all practicable steps are being taken to remove the fumes and to prevent any more fumes coming in and unless a suitable test has shown that the air is now safe to breathe. If the test has not been made, then a person entering must wear a belt with a rope attached, the rope to be held by a person outside or, alternatively, the person entering must wear a breathing apparatus. By the 1948 Act, it is required that, without prejudice to the above, no one shall enter a confined space unless he is ensured of a supply of air adequate for respiration and to render harmless any fumes or he is wearing a suitable breathing apparatus. So that, whereas previously it was only necessary to act when there was the likelihood of dangerous fumes being present, now action must be taken, in every case, to see to it that the air is adequate for respiration or, of course, the alternative action may be taken and breathing apparatus used. Other requirements include having people trained in the use of the apparatus and in the method of restoring respiration. The apparatus and equipment are to be examined once per month and to be kept readily available.

The section that follows is concerned with the risk of explo-

sion of inflammable gas and dust. Plant should be enclosed and the dust either removed or steps taken to prevent its accumulation and the source of ignition should be excluded or enclosed. Where the plant is not designed to withstand the pressure likely to be produced by an explosion it must be so designed as to restrict the spread and effects of it by means of chokes, baffles, vents, etc. A sub-section requires that where plant contains explosive or inflammable gases or vapour, at a greater pressure than the atmosphere, then the plant shall not be opened before any flow of gas into the plant has been effectively stopped by a stop valve or other means and all practical steps taken to reduce pressure of the gas to atmospheric pressure. Also, when plant has been opened up or loosened, gas shall not be allowed into the plant until it has been secured. But there is a provision that this sub-section does not apply to plant installed in the open air.

Finally, tanks or vessels which have contained explosive or other inflammable substances are not to be subjected to any heating process such as welding, brazing, etc., until steps have been taken to remove the substance and any fumes that arise but various exemptions have been granted to cover welding on water-sealed gasholders, gas mains, etc.

Water-sealed Gasholders

And now we come to Section 33 which is probably the section best known to many of you. It deals with 'precautions as respects water-sealed gasholders.' A gasholder means a water-sealed holder with a storage capacity of not less than 5,000 cu.ft. It must be of sound construction and properly maintained, be thoroughly examined externally at least once every two years and details of this examination kept. Where any holder lift has been in use more than 20 years, the internal state of the sheeting shall be examined once in every ten years. A signed record shall be kept showing the date of construction as near as it can be ascertained of the oldest lift of every holder. And, of course, unless we keep details of the dates of construction of all the lifts, we will not be able in time to provide this record of the oldest lift. When there is more than one holder, they shall be numbered. Finally, repairs or demolition shall be carried out only under supervision of a competent person.

Fire Hazards

Now we come to the requirements dealing with fire precautions some of which have been very much to the fore recently. The first section requires that each works which employs more than 20 persons or which falls under certain other categories must be provided with a certificate from the District Council certifying the premises as safe for the employees in respect of means of escape in case of fire. The District Council will not issue this certificate until any alteration considered necessary has been carried out. After the conditions are such as to allow the certificate to be issued, then the various means of escape must be properly maintained and kept free from obstruction. Further, if the conditions in the factory alter materially, *e.g.*, an increase in the number of employees beyond the number covered by the certificate or, if there are alterations to buildings, etc., the occupier must give notice in writing to the District Council. The section goes on to deal at some length with the administration of this matter.

Probably I should remind you, at this stage, that the Act is concerned with the safety of the employees and not the works buildings themselves and the sections that immediately follow are aimed at ensuring the safety of the workers partly by ensuring their rapid exit from the dangerous area. But there are no requirements aimed at protecting the building; the Act nowhere requires any fire extinguishers to be kept.

A later section outlines the general precautions to be taken in case of fire. During working hours, doors are not to be locked or fastened in any way which would prevent them from being easily and quickly opened from the inside. Doors should generally open outwards or be of the sliding type. Fire exits must be conspicuously marked by a notice in red letters and, as the Acts put it, 'of an adequate size.' The contents of a room shall always allow free access to a means of escape.

Finally, where more than 20 persons are employed in the same building and explosive or highly inflammable material is stored or used in any building in which persons are employed, effective provision shall be made for giving warning in case of fire which shall be clearly audible throughout the building. It is this particular matter which has been exercising our minds a good deal recently.

General Welfare Provisions

The Acts lay down a few minimum welfare requirements to assist in maintaining the wellbeing of the men and women who work in factories. These requirements are small in number and vary from the comparatively simple matter of providing the worker with a supply of wholesome drinking water to the more complicated one of providing him with a specially designed seat from which to work if his job is one that can properly be done sitting. The other requirements deal with the provision of washing facilities, accommodation for clothing, first-aid, etc.

The first of these Welfare General Provisions is the obligation to provide a supply of wholesome drinking water. Wholesome drinking water, provided at suitable points conveniently accessible to all the persons employed is what has to be provided. Such water, the Act says, coming from a 'public main or some other source approved in writing by the District Council' must be supplied. The tap or jet should be marked 'Drinking Water.' It should be remembered too, that except where the water is supplied in an upward jet, one or more suitable cups or drinking vessels are to be provided at each point of supply with facilities for rinsing them in the drinking water.

A matter which, although it is not a legal requirement, should be borne in mind is the effect of the considerable heat which exists in parts of our works. This brings about a good deal of perspiration and makes advisable the supply of salt tablets to replace the lost sodium chloride. These tablets will be taken with water and should, of course, be provided near the drinking water supply.

Adequate washing facilities, which shall include soap and clean towels or other suitable means of cleaning and drying, must be provided. What are adequate facilities? I would suggest one wash handbasin for every ten workers where the work is of a dirty nature and one for 20 when it is not. Note, too, the requirement to provide 'clean towels or other suitable means of drying.' We often overlook this. It does not meet the legal requirements to issue a towel and leave it to the workman to have it laundered. The washing facilities are not regarded as suitable unless warm water at least is provided. When up to, say, half a dozen persons are employed, warm water may be obtained from a kettle but, if there are more than that number employed, the warm water should be on tap.

It should be kept in mind that pitch and tar contain carcinogenic substances and, if the risk of cancer is to be kept at its minimum, then there must be a high standard of cleanliness on the part of the worker. In turn, this requires good washing facilities. In fact a standard considerably higher than the minimum standard laid down in the Factories Acts, and, on a good many works, we already have this in the form of a block, housing shower baths, individual lockers, etc.

We must provide adequate and suitable accommodation for clothing not worn during working hours, and another requirement is the need to have arrangements for the drying of outdoor clothing. Sometimes, this will take the form of a special drying room but, on other occasions, pegs positioned near hot water boilers or the like will suffice.

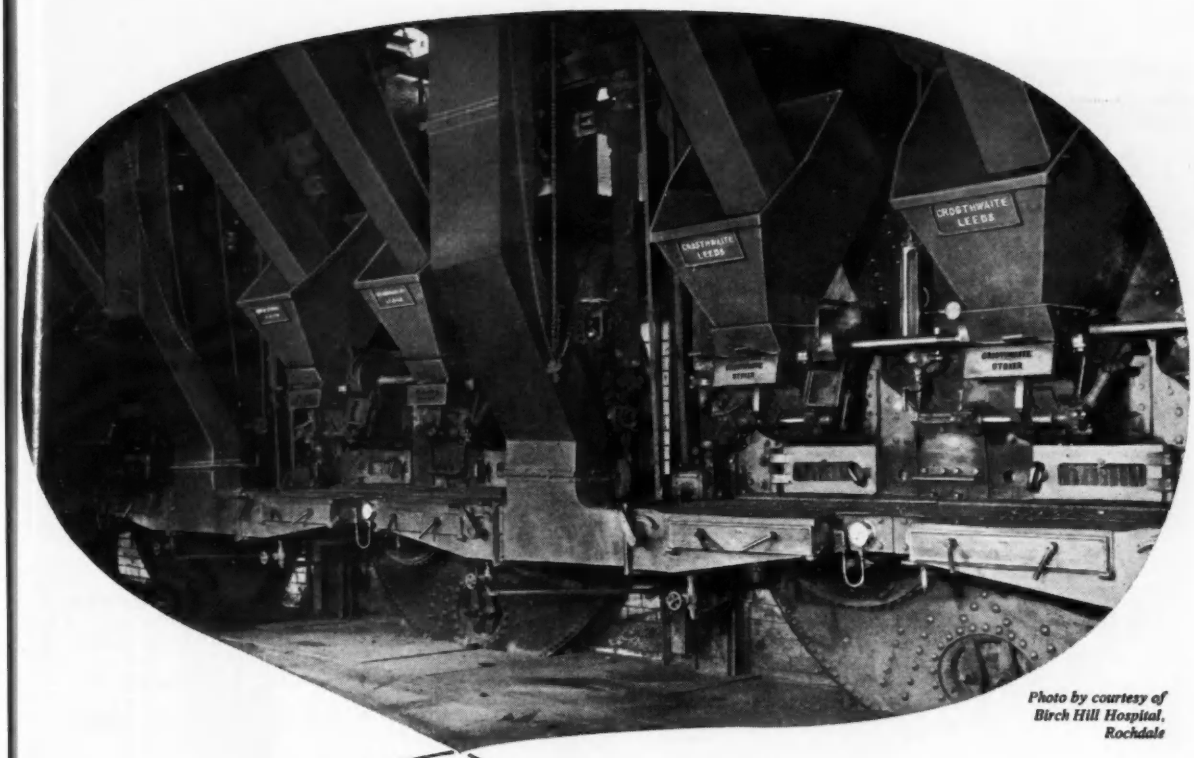
Sitting Facilities

Now we come to the comparatively new requirements dealing with the provision of seats. In the past, the requirement to provide sitting facilities concerned women only. The new requirements, however, under the 1948 Act (section 6) cover men as well as women, and there are now two distinct sets of circumstances under which it is compulsory that sitting facilities be provided.

(i) When, during the course of the work, there are reasonable opportunities for sitting without detriment to the work, then seats must be provided. These we call occasional seats.

(ii) When a substantial proportion of the work can properly be done sitting, then a seat of appropriate design and construction, along with a foot-rest, if necessary, is to be provided for the worker.

While we may be providing the seats used for occasional use, it is very doubtful if we provide seats for all those jobs which can properly be done sitting.



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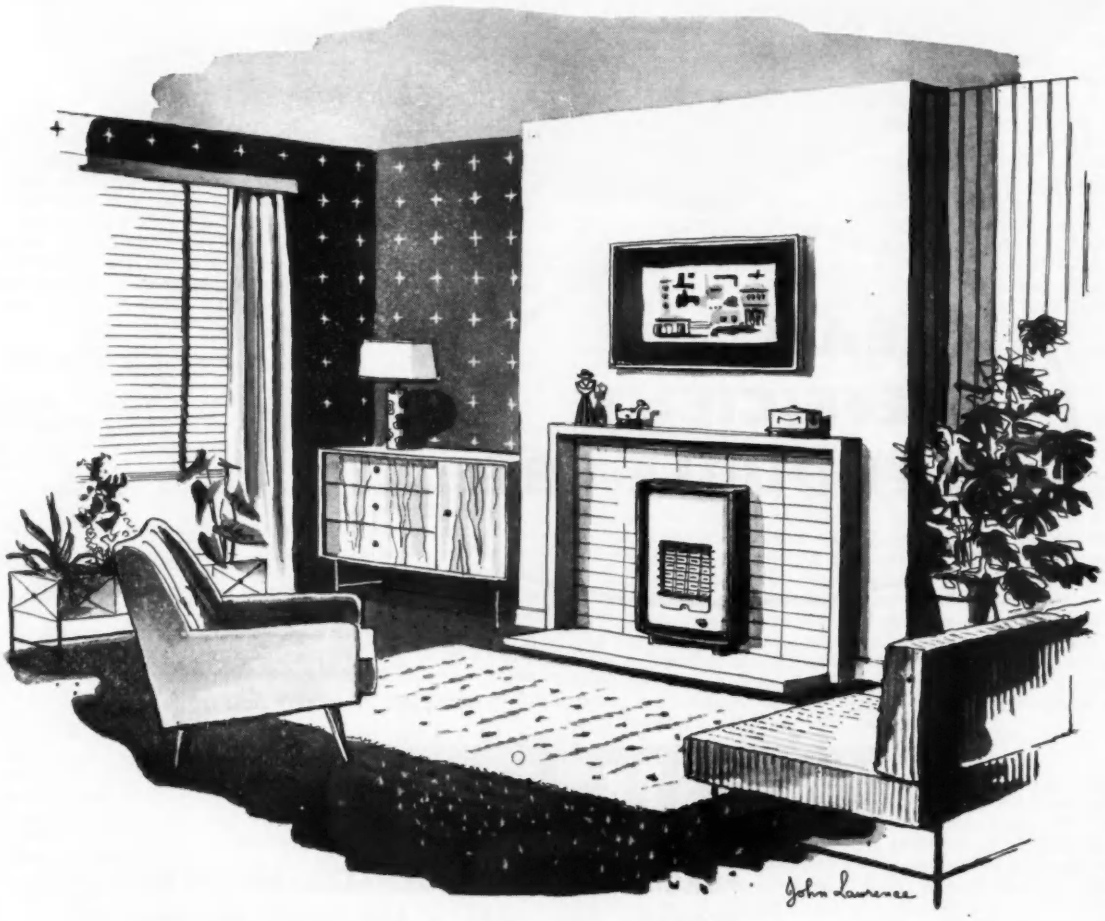

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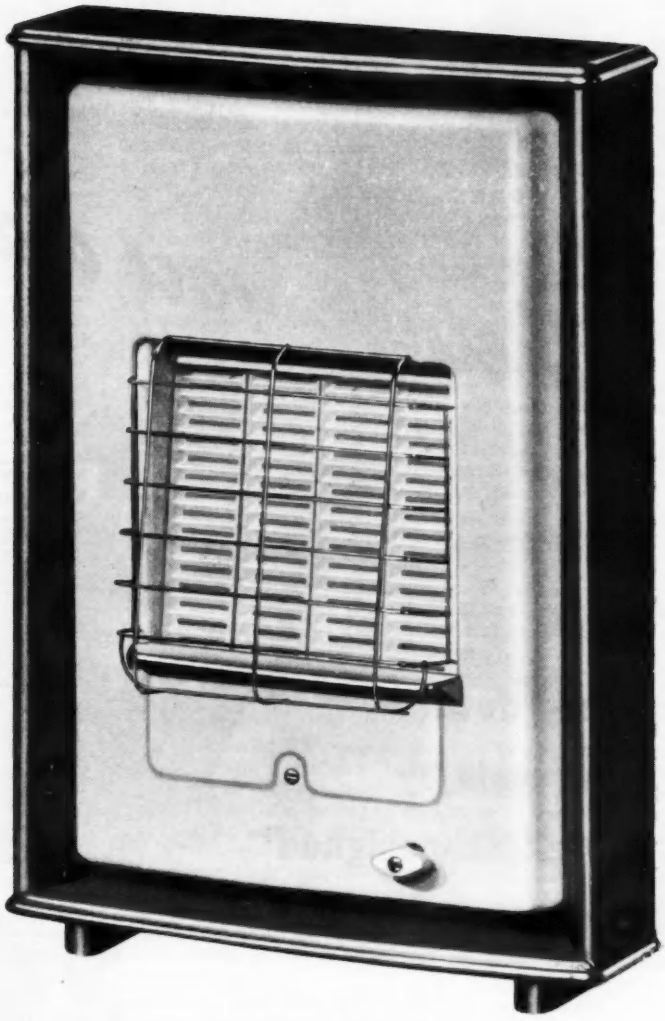

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DISCUSSION

In the discussion which followed, **Mr. W. R. Branson,** Deputy Chairman, West Midlands Gas Board, said he thought it appropriate to recall that the Gas Act charged gas boards with the responsibility of promoting the safety, health, and welfare of those employed in the industry. They were expected to fulfil under the Act some matters which could not be statutorily required under the Factories Acts. In other words, if they were to be successful as good employers, they must go rather further than the Factories Acts requirements. He thought he was right in saying there had so far been little or no reduction in the number of accidents that occurred in gasworks throughout the industry. This might be associated with the type of labour that had been available since the war; but it seemed that merely taking steps to conform with the law —and even going further—did not, in itself, necessarily reduce the number of accidents. They probably needed to go further still in enlisting the support of the employees themselves in actively thinking about safety.

Last year's accident figures were just under ½% of the possible man hours, continued Mr. Branson. That did not sound high, but it meant that, throughout the year, either the State or the gas boards would pay over £500 to men who had been incapacitated. That was rather a large number of people incapacitated when it was realised that looking after them had involved all steps in accident prevention.

Referring to the passage in the paper regarding the need for audible warning of fire where more than 20 persons were employed in the same building and explosive or highly inflammable material was stored or used, Mr. Branson asked whether the warning signal need be in one place or whether a series of alarms was needed. Exactly how would they meet that requirement, he asked.

He thought in complying with the requirements for safety they had to use commonsense. It was not always easy to find people to deal with certain things in a small gasworks and in some of these it might involve spending more money for lighting precautions than the value of the machines installed in the buildings. He thought they had to try to find other ways of meeting the requirements of the Acts if they possibly could and he wondered whether more use of external means could not be made to avoid throughput.

The Board appreciated the useful work Mr. Brown had done. They felt it was very important to have on their staff someone who could go round the works and tell the men what to do and how to do it, and generally promote their health and welfare.

Dr. N. Williams, Medical Officer to the East Midlands Gas Board, said safety, health, and welfare were the responsibility of the manager, but they had shown that the doctor was, in fact, the health manager. They held skin inspections throughout the area and had an opportunity of noting the varying incidence of skin troubles which arose from contact with tar. At one works in the area, he had noticed that the incidence of skin troubles was very much higher than in works using the same kind of coal and similar plant. The difference between one works and the other lay in the washing facilities —the higher incidence of skin troubles in one works was due to poor washing facilities.

Mr. Brown had complained of inadequate drying facilities for workers in some instances. He had been in washrooms and seen towels hanging up black and often soaked with water as well. They looked as if they had been there for a couple of weeks; they certainly ought to have been changed. On the other hand, he did not think paper towels were a very satisfactory means of drying unless changed very frequently. They were not, as was sometimes thought, more expensive than others, however.

Dr. Williams illustrated the importance of cleanliness by citing the experience they had at one of their works recently, with an outbreak of boils. They investigated the matter and found that a few of the men had been using towels which were not changed as frequently as they should have been, and the infection had spread from man to man and become an epidemic.

Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire and Herefordshire Division, said he agreed with Mr. Brown that the Factories Acts were only one part of the instructions they had to follow to promote safety in the industry. They were deeply concerned with safety. He thought that success depended on the degree to which they were able to carry their convictions to subordinates and get right down to the operatives. He made a plea for the setting up of works joint consultative committees.

Mr. F. L. Atkin, Chief Distributing Engineer, West Midlands Gas Board, proposed a vote of thanks to Mr. Brown for a very excellent paper which showed a thorough grasp of the subject. He was quite sure that if they supplemented the provisions of the Factories Acts with the things Mr. Rendle had mentioned they would be repaid the cost by increased technical efficiency and productivity. He was old enough to remember that, some years ago, the Factories Acts were thought to be the means of impeding production; but, thank goodness, those days had passed. Gas lighting was dead. Nevertheless, the question of electric lamps fusing owing to dust was one point in favour of lighting with gas mantles. In the textile factories of Lancashire and on railway stations mantle lighting was considered very good from that point of view.

Mr. F. G. Pyper, Chief Engineer, East Midlands Gas Board, seconded the vote of thanks which was carried with acclammation. Mr. Brown returned thanks.

At the meeting, the I.G.E. Certificate of Associate Membership in Gas Engineering (Manufacture) was presented to Mr. P. F. Heitzman, second engineering assistant, West Midlands Gas Board, Saltley Works, Birmingham.

Members lunched at the King's Head Hotel as guests of Herbert Morris, Ltd., and afterwards toured the firm's North and South Works.

Herbert Morris, Ltd., was founded in London by the late Herbert Morris more than 70 yeas ago and was moved to Loughborough 16 years later, probably because of the town's central position. By the end of the first world war all available space on the original works site was occupied and building began on a new site to the north of the town. The works then erected have since been greatly extended and today the total area occupied is about 60 acres; 2,000 people are employed. There are four works named after the points of the compass and these probably comprise the largest undertaking in the world for the manufacture of lifting and conveying machinery.

In the South Works, main production is of pulley blocks roller conveyors, lever hoists, stacking machines, and manually operated lifting gear generally. There are a large machine shop and several assembly bays with a section where pulley-blocks are tested.

The East Works (where the main offices are located) has a large department manufacturing electric hoists and components such as switches, brakes, controllers, and electric motors; a forge where crane and pulley-block hooks are made, a tool room to furnish the rest of the works with fixtures, jigs, and tools; and an apprentices' training centre in which six months' initial instruction precedes experience in the various departments. Training occupies five years. Each apprentice attends Loughborough College one day each week.

The Morris foundry is mechanised. This is in the West Works and faces the main offices. In the same building there are a fettling shop, a large pattern shop, core shop, and metallurgical laboratories.

The more spectacular products—electric cranes, conveyors, elevators and so on—are made in the North Works, which has eight bays, seven of them being 64 ft. long and one 500 ft. long. In the yard outside there is a 25-ton Goliath crane of 100 ft. span and about 91 ft. height.

The London to Manchester main railway line adjoins the works and there is a direct connection of about a mile of private sidings; there are two shunting locomotives.

There is ample storage space for stocks of materials in the yards and a large area is used for weathering castings. Two mobile Morris cranes serve these areas. Altogether 60 Morris cranes of various types are in use in the North Works.

Extensive sports gounds are provided for employees.

'A New Era of Technical Adventure'

by

T. NICKLIN,

M.Sc., M.Inst.Gas E., A.M.I.Chem.E.,

Production Engineer, N.W.G.B.

WE might ask ourselves: Why have the fundamental processes of gas manufacture not been developed and what is the incentive for development? These two questions are, in fact, the same, since the incentive for development obviously gives rise to development itself. We have reached the stage where, without new techniques designed to reduce the cost of the final product, we might become less competitive with electricity and oil.

The cost of gas produced by the carbonisation of coal has always been greatly influenced by the revenue received for the residual products associated with gas manufacture. The higher the revenue from coke and tar the lower the gas cost into holder.

During the past seven years—and you will note that I have only taken seven years—coal has risen from 57s. 6d. to 95s. 4d., whereas coke has been sold from 53s. to 87s. 5d. The net cost of coal has risen, the rise being most emphasised between 1953 and 1954 where the revenue from residual products, coke and tar, was very much less than the rising cost of coal. Between 1954 and 1956 a more or less constant net cost of coal is shown this being a reflection of the sharp increase in revenue from residual products. There is a limit to the revenue we can expect to obtain from residuals and the tendency of future increases in coal price will be to increase the net cost of coal. The result is that it will become less economic to produce solid fuel in the gas industry in the form that we know coke today.

Smokeless Fuel Must Be Sold at Premium Price

With the implications of smokeless air, the gas industry will be expected to produce smokeless fuel which can be burnt on existing appliances, such as, for example, the stool grate. The production of smokeless fuel of sufficient reactivity to allow of free combustion on a stool grate will result in a loss in gas output from the carbonising plant. In order to maintain the level of gas price it is necessary that the smokeless fuel should be sold at a premium price.

The output of gas per unit of carbonising plant with smokeless fuel production will be obviously much less than with the same plant making gas under high temperature carbonising conditions. However, by adopting the gas injection technique at the base of the retort, it is possible to increase the gas output to 80% of the output under high temperature carbonising conditions.

Should the demand for smokeless fuel involve the complete turnover of carbonising plant to its manufacture, there will be a reduction in gas output, even with gas injection conditions of operation; this would mean the installation of additional plant to satisfy the gas demand with the consequent expenditure of capital. The cost level of gas production would ultimately rise with increasing coal price, since there would be a repetition of to-day's state of affairs whereby the revenue we receive from the solid fuel residual is not able to keep pace with increasing coal price.

There would, therefore, appear to be a period ahead which will involve the production of gas and smokeless fuel, and in which the cost of gas production can be maintained competitive with alternative fuels. However, we must ultimately lose our position in a competitive field under this system of manufacture and we must look to other methods of cheapening the price of gas since there is an obvious limit to the extent to which revenue from residuals, as we know them today, such as coke and tar, can go.

New techniques of gas manufacture are therefore required, designed to produce gas without a solid residual but before proceeding in this direction it is well to examine the effect of capital and labour on the cost of gas production.

A graph indicated the effect of rising capital and labour costs over the past 20 years, on the cost of gas manufacture in high temperature carbonising plant. The graph indicated the necessity for increased output per unit of capital employed and a need for reduction in labour.

Gas manufacturing plant is composed of a series of small units carbonising from one to 12 tons of coal per day and operating at approximately atmospheric pressure. A gas undertaking making 20 mill. cu.ft. of gas per day will consist of between 100 and 150 units of carbonising plant to carbonise approximately 1,000 tons of coal per day. The greater the number of units in any process the greater the labour force required, the greater the amount of maintenance and the greater the difficulty in keeping plant efficiency at a maximum.

When consideration is given to the carbonising rate of less than 50 tons of coal per hour, for a plant carbonising 1,000 tons of coal per day, each unit will have a carbonising rate of from one-third to half ton per hour. Compare the unit hourly rate with a catalytic cracker in the oil industry having a unit rate of more than 500 tons of crude oil per hour.

Manchester District Junior Association of Gas Engineers, President's Day and A.G.M., Bradford Road Works, October 6.

The indication is that gas manufacture, even on the largest producing station, should be confined to a unit carbonising vessel as opposed to the multitude of units we have today.

It is obvious that the rate of gasification must be increased and that, with the present retort system of gasifying coal, it is not possible to achieve the rate or the unit production desired in order that costs per therm may be reduced.

When coal or oil is gasified at atmospheric pressure using air as a source of oxygen, a gas of a calorific value of 125 B.Th.U. per cu.ft. is obtained. This calorific value is too low for use as town gas. However, by using technically pure oxygen in place of air the calorific value is increased to 300-350 B.Th.U. per cu.ft. The operation of an oxygen gasifier under pressure will result in an increase in methane production, with a corresponding increase in the calorific value to town gas standard.

The design of gasification plant working at higher pressures is indicated as a way of reducing both capital and labour costs, since the operation of the gasification plant under pressure also allows purification processes to be operated under pressure, thereby introducing washing methods for sulphuretted hydrogen removal, organic sulphur removal and the removal of other products associated with the gasification of coal.

An interesting combination of high pressure processes would appear to be ideally suited for application to the gas industry wherein coal, oil or tar is gasified by means of oxygen at high pressure to produce a gas which is essentially a mixture of hydrogen and carbon monoxide. Applying the water gas shift reaction, the carbon monoxide is converted to carbon dioxide with the production of an equivalent volume of hydrogen. After scrubbing out the impurities such as the carbon dioxide formed in the shift reaction, substantially pure hydrogen is obtained which may be used as a synthesis gas or to hydrogenate coal or oil to give a resultant gas which, after removal of benzene, tar and sulphuretted hydrogen, is suitable for town gas.

(*Concluded on p. 308*)

Presented to the Wales and Monmouthshire Junior Gas Association on September 27.

Peak Load Medium Pressure Distribution Systems

By W. M. MOXLEY, B.Sc., A.M.Inst.Gas E.,
TECHNICAL ASSISTANT TO THE DISTRIBUTION ENGINEER, WALES GAS BOARD

THE increasing cost of laying mains and services is causing great concern in an industry which, while striving constantly to give a first-class consumer service, has to be satisfied that it can only give that service at an economic cost. It is a fact that costs of laying mains and services have increased at a greater rate than have the costs of boosting plant, and of electricity and fuel for the prime movers; a reversal of this trend does not appear imminent.

The daily output diagram for an average undertaking has changed considerably in the past 20 years, due mainly to the loss of the lighting load, and is now characterised by the cooking load peak. This diagram must therefore be regarded as transient and allowance must be made in the calculations for future loads which may tend to increase the spread as well as the instant value of the peak.

The design of gas grids in many cases causes a comparatively high terminal pressure at grid reception stations, and this is particularly the case in the North Wales and Pembrokeshire Grids, where the gas velocity is restricted to 45 ft. per sec. to avoid internal erosion of the steel main and valves. A section of this paper deals very briefly with two methods of utilising some of this terminal pressure energy.

For conventional low pressure distribution systems the ideal pressure differential at a consumer's meter should not exceed $\pm$1.0 in. W.G. and in the past distribution systems were generally designed to give this service. These mains, however, are only utilised to their full capacity during the comparatively short peak load periods, so that during the long off peak periods much smaller mains would suffice. The practice of laying such mains was costly.

In many existing distribution systems the development that has taken place during the last decade has caused pressure differentials during periods of peak demand to exceed greatly the ideal $\pm$1.0 in. W.G., with the result that many areas are unsatisfactorily served during these peak periods. To restore such pressure differentials to the ideal value for low pressure distribution, a large amount of capital would be required to lay additional mains; but such large capital expenditure to overcome this short period deficiency is undesirable, even though the necessity of correcting the fault has to be acknowledged.

Two-stage Governing

Schemes designed to improve conditions at consumers' meters can be applied to existing distribution systems, where increased demands have made them inadequate to cope with the peak loads under normal low pressure conditions, and to new development work where pressure energy is available.

The principle underlying the peak load medium pressure system makes use of higher differential pressures over the distribution systems during periods of peak demand only, and requires smaller mains than would otherwise be necessary. The consumers' supplies are protected against pressure variation by the installation of service governors on the inlet of every consumer's meter, and the control of district pressures by station or district governors.

The system, therefore, depends upon two-stage governing; the first stage is the control of off-peak and peak pressures from station or district governors and the second is the control of pressure at consumers' meters by the use of service governors. Since the installation of boosting plant is now normal practice to enable the maximum of an undertaking's holder stock to be utilised, there should be no difficulty in maintaining a higher pressure at the centre of distribution.

The immediate advantages of the system will be that it is very flexible and will, therefore, accommodate large increases in the peak demand, it dispenses with the necessity to lay large mains, and it maintains at consumers' meters a constant pressure of 4 in. W.G.

The constant pressure at the meter will mean that gas measurement on domestic meters will be more accurate, and it will do away with the fitting of governors to individual appliances which will be operating at their optimum efficiency.

The disadvantage of the system, however, is that for short periods the mains and services are subjected to higher pressures than would be met under normal low pressure conditions, with a tendency to increase the unaccounted-for gas. However, such evidence shows that the gas lost by leakage from mains and services is usually between 1-2% of the total gas bought or made, and the leakage varies directly as the square root of the pressure, the additional volume lost by leakage will be small, especially as periods over which higher district pressures prevail are of short duration.

Two Methods

By applying the principle of 'peak load medium pressure' to new development work, savings in capital expenditure, over conventional low pressure systems, of up to 30% have been made, in contrast to saving as much as 800%, based upon equal consumer service for existing low pressure distribution systems on conversion.

In the case of existing distribution systems the pressure differentials may be limited by the physical condition of the mains and services. If the mains and services generally are sound, there is no cause for anxiety since outside the peak periods the system will function as a conventional low pressure system, and the maximum off-peak pressure differential over the whole district will be limited to 2 in. W.G.. The system, therefore, is designed to accommodate the off-peak loads under normal low pressure conditions.

Where undertakings are recipients of grid gas, the boosting costs can be substantially reduced by allowing the pressure energy of the grid supply to do some or all of the work at peak demand periods, though boosting plant with a capacity at least equal to the anticipated maximum peak instant should be installed, so that supplies can be maintained in the event of a grid failure. Two methods of utilising some of the pressure energy in the grid present themselves:—

Method 1.—By the introduction of a spill-over governor.

Method 2.—By the application of 'jet boosting' at stations receiving a bulk supply of gas.

This well-known principle involves the conversion of the grid pressure energy into kinetic energy by means of a jet, and the high velocity jet is then instrumental in inducing the gas flow from the gasholders. Ratios of total flow to jet flow of up to 5 to 1 were obtained with a 'jet' pressure of 3.24 in. Hg. giving additional pressure over gasholder pressure of 6 in. to 7 in. W.G. The apparatus is being developed and tests, which are continuing, are giving results which confirm the effectiveness of the principle.

The above methods of utilising residual grid pressure, however, do not save capital expenditure since boosting plant has to be installed as a safeguard against the failure of the grid, but there is a considerable saving in running costs.

Constant pressure service governors with compensating diaphragms capable of withstanding an inlet working pressure up to 40 in. W.G. are available at reasonable prices, and they can, without difficulty, be connected directly to the inlet of the meter.

But governors become markedly more expensive when they are designed to withstand pressures above 40 in. W.G. So the comparative cheapness of standard service governors adds

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- A modified hob having no raised ribs
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- Increased tension on door closure spring
- New style pan supports
- Spillage tray has guide ribs to locate grill pan
- Cream plastic fittings to all cream finish
- Oven grid shelves chromium plated

The No. 21 Century is available in these colour finishes:

CREAM and BLUE · CREAM and GREEN · ALL CREAM

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C125

Main Adonis Instantaneous New

for single point or dual point use at the sink and wash basin

Here is an instantaneous water heater embodying all those features which appeal to the modern housewife — and at a price which she can afford. Simple, efficient operation; economy in use of gas; attractive contemporary design; easy-to-clean vitreous enamel finish, with a choice of colours*.

The "Adonis" can be used as a single-point, or as a small multi-point heater to serve, for example, both kitchen sink and bathroom washbasin. The "Adonis" fits flush to the wall and can be connected to standard jigged wall fittings, if desired.

Maintenance is simple — most operations can be carried out without turning off the gas and water supplies at the main.

* *The Adonis is available in Cream, White Blue or Green vitreous enamel finish*

MAIN WATER HEATERS LIMITED · CROYDON · SURREY

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W68

SAML CUTLER & SONS LTD.

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'HYDRALITE' HYDRAULIC JACKS

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Model	Capacity (tons)	Weight (lb.)	Power Lift (in.)	Closed Height (in.)
6515	15	24	6.5	11·375
625	25	32	6	11·5
650	50	61	6	13
1215	15	38	12	18·25
1225	25	53	12	18·875

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AD.MI

to the financial attractiveness of peak load medium pressure systems.

Two practical illustrations of 'peak load medium pressure' working with particular emphasis on its economic advantages are of interest. The first applies to the conversion of an existing distribution system.

A survey of one of our smaller undertakings was made in December, 1955, to find out why excessive district pressure was necessary during peak periods in a conventional low pressure system. During the investigation, the gas flows to various parts of the district were ascertained and related to peak load conditions and the results of the survey confirmed that the district mains were inadequate for normal low pressure distribution during periods of peak demand. It showed that the district mains, services, domestic meters and carcassing were being subjected to high pressures during the build up and receding of the peak demand. This practice is not only uneconomical from a gas measurement point of view, but it also impairs the performance of appliances and increases the danger of gas leakage from tin-cased meters and from domestic carcassing. Two improvement schemes were therefore submitted for consideration by the Board. The first involved the laying of additional low pressure feeder mains to supplement a large proportion of the existing district mains, to maintain the conventional low pressure system. The ultimate maximum peak load flow was estimated to be 20,000 cu.ft. per hour and the cost of laying the extra mains to limit the peak load pressure differential to ideal low pressure standards was as follows:—

	Capital Cost £	Depreciation at	Annual Charge in £
(1) 1,417 yd. 8 in. dia. main at £3 10s. per yd.	4,960	6.62%	328
(2) 1,900 yd. 6 in. dia. main at £2 10s. per yd.	4,750	6.62%	314
(3) 1-6 in. station governor	250	9%	22.5
	£9,960		£664.5

The second scheme recommended the conversion of the distribution system to a 'peak load medium pressure' system. This scheme involved the installation of:—

	Capital Cost £	Depreciation at	Annual Charge in £
(1) 1—30,000 cu. ft. / hr. 20 in. W.G. uplift booster	300	6.8%	22.0
(2) 1—Clock controlled district governor ..	200	8.4%	16.7
(3) 850 service governors	750	7.4%	55.5
(4) annual power costs			15.0
	£1,250		£109.2

The second scheme showed a saving in capital expenditure over conventional low pressure methods of £8,710, or 785%, and an annual saving of £664.5 less £109.2, equal to £555.3. The second illustration applies to new development work.

In 1955 one of our larger undertakings submitted a scheme to supply gas to a local authority housing estate of 2,700 dwellings, shops, etc.

It had been decided, in principle, to lay a medium pressure reinforcement main through the centre of this estate to supply the estate and to supplement supplies at the extremity of the district beyond the estate.

The original scheme conformed to standard low pressure distribution practice, and it consisted of three governed supplies from the medium pressure main feeding into a 12 in. low pressure principal feeder main from which emanated 9 in. diameter and 6 in. diameter secondary feeder mains. The district governors were intended to operate with a maximum outlet pressure of 6 in. W.G. and the ultimate maximum demand was estimated to be 81,000 cu.ft. per hour with an estimated peak load pressure loss over the whole estate of 1.5 W.G.

The proposed sizes and lengths of mains and services required (excluding the medium pressure reinforcement main) and the cost were as follows:—

Mains diameter	Length	Estimated Cost per yard	Capital Cost £	Depreciation at	Annual Charge £
12 in.	2,724 yd.	110 s.	14,982		
9 in.	997 yd.	80s.	3,980	6.62%	
6 in.	2,169 yd.	50 s.	5,423		
4 in.	19,882 yd.	35 s.	34,800		
			£59,185		£3,910
Services 1 in. and 1¼ in. 41,050 yd. at 10s.			£20,525	9%	£1,800
Totals			£79,710		£5,710

It was reasoned that, if the potential energy in the medium pressure main were utilised, the 12 in. diameter principal feeder main could be reduced to 6 in. diameter, giving a differential pressure of 11.5 in. W.G. The district governors would then have to be set to give, say, 17 in. W.G. at their outlets during periods of peak demand, instead of 6 in. W.G. for the low pressure system, to maintain satisfactory pressure conditions at the extremity of the estate. In the interest of further economy the district governors would need to be clock operated to control off-peak district pressures. The maximum off-peak pressure differential was estimated to be 1.75 in. W.G.

In addition to the reduction of the principal feeder main from 12 in. diameter to 6 in. diameter the auxiliary feeder mains were also substantially reduced in size and further economies were made by using single mains and dual services. This is a practice that is now coming back into favour because of economic methods of the relaying cross-road services, and the standardising of internally coated and externally wrapped service pipes.

Sizes and lengths of mains which were now required are:—

	Capital Cost £	Depreciation at	Annual Charge £
Mains			
6 in. 3,746 yd., 50s. per yd.	9,365		
4 in. 4,725 yd., 35s. per yd.	8,260	6.62%	2,830
3 in. 17,207 yd., 27s. per yd. ..	1,960		
2,700 service governors at 15s. each ..	2,025	7.4%	150
	£44,860		£2,980
Services			
1 in. and 1¼ in. 41,050 yd., 10s.	20,515		1,800
	£65,385		£4,780

Total saving in capital expenditure is £79,710 less £65,385, equal to £14,315 or 18%, with a saving on mains only of 24.2%.

There will also be an annual saving of £5,710, less £4,780, equal to £930. The cost of the district governors is not included, as it will be common to both schemes, as is the medium pressure reinforcement main.

The above scheme is designed to accommodate an increase in the ultimate foreseeable maximum demand of 50%. In this particular case power costs do not enter into the calculations because in the 'medium pressure system' the smaller mains dissipate the energy, whereas in the low pressure system the energy is absorbed by the district governors.

This pressurising of the system could be extended to a point where the demand reached 150% of the ultimate foreseeable maximum, before the laying of larger mains would become economic.

These applications illustrate the economies that can be achieved by various departures from standard distribution practice, and the considerable increase in the useful capacity of existing distribution systems which can be achieved by the use of service governors and peak load boosting.

And so, by designing new distribution systems to accommodate peak load pressure differentials of up to, say, 27 in. W.G., large capital sums can be saved, which can be even greater if this principle is coupled with the laying of single mains and dual services without in any way lowering the operational efficiency; in fact, the service to the consumer is invariably improved.

As there is every reason to believe that the present development of gas sales will continue, many existing distribution systems, both large and small, which may be adequate at present, will undoubtedly suffer peak load embarrassment as the demand grows, and in such cases 'peak load medium pressure' should offer an excellent solution to their difficulties.

DISCUSSION

Opening the discussion which followed **Mr. J. F. Day** (Pontypool) made three points. First, they should not be deterred from increasing pressures on the district because of leakage; the thing to do was to deal with the leakages. Secondly, was 65% a correct booster efficiency? Thirdly, no mention had been made of the question of annual charges for the cost maintenance of the service governors. There was bound to be some maintenance particularly where there was dust in the mains and where drier gas was being distributed. Was the question of maintenance going to become important. In the example used in the paper maintenance might reach perhaps £100 per annum on a small undertaking.

Mr. Moxley: I agree with you on the question of unaccounted for gas. The Wales Gas Board are aware of it and systematic barring has been carried on for some time. With regard to the second point, 65% is fair for a fan type booster, or for the electrical driven prime mover and booster. In the case of diesel engine driven sets this is rather optimistic. Thirdly, the annual charges include 1.4% for maintenance which is estimated on the experience of other Boards.

Mr. A. Yates (Cardiff) suggested that a figure for increased unaccounted-for gas might possibly have been included. He was not suggesting that the extent should militate against the installation of such a scheme, but he suggested that it might point more clearly to the need for improvement in the town's distribution system. Where electrical boosters were installed in a distribution network known to be inadequate at peak demand a power failure could cause havoc. Had the author suggestions to offset that possibility?

Mr. Moxley said that it is not the general practice to put stand-by equipment in. Where the incidence of power failure was high they did recommend it, but not in every case. They felt power failures were a thing of the past, and if the booster and prime mover were adequately serviced and maintained it was only in the remote case that a failure of the prime mover occurred. Referring to unaccounted-for gas, the pressure differentials they were considering in this system were not very high, the maximum anticipated being in the order of a pound. The leakage was directly proportionate to the square root of the gauge pressure. He agreed that some extra leakage would take place, but they had no real means of assessing how much it would be. The amount compared with the present unaccounted-for would be small, and if the mains were really bad they would not apply the system anyway.

Mr. Yates suggested that in an undertaking of approximately 5 mill. cu.ft. a day, with 1-2% at mains, the extra unaccounted-for gas might cost £2-300 extra a year.

Mr. Moxley replied that that would be rather high on normal peak load systems. Normal boosting times would be only about an hour a day.

Mr. M. E. Scott (Wales Gas Board H.Q.) commented that many of these systems were working at 15 to 16 in. W.G., and by raising them by three to four inches and governing at the meters they were giving better consumer service.

Mr. D. Muir (Pontypool) said that when district pressure increased leakage became more noticeable. They had put all their pressures up in the South and it was remarkable how their unaccounted-for gas increased because it was more noticeable—and they got more life out of the meters.

Mr. Moxley said that the strain on the meter was constant the whole time at 4 in. W.G. Reducing the pressures at the inlet to the meter and keeping it constant was far better for the life of the gas meter and the appliances.

Referring to conversion costs, **Mr. T. F. Edwards** (Newport) asked how a figure of 800% was arrived at in one case and near that in the second.

Mr. Moxley: 'No matter how good a low pressure system is, it is not as good as medium pressure to the consumer, even though you allow 2 in. variation. The cost involved in the one case was £9,960 and in the second system £1,250, which shows a saving of 785%.' With regard to the jet boxes the volumetric governor was not affected in any way. The outlet pressure was controlled by the spill-over governor.

He thought it was a thing of the future. In the Neath undertaking a lot of work had been done on it. They had very high pressures in West Wales where higher pressure loads due to the jet boxes could be maintained. It saved a considerable amount in costs.

Mr. Scott asked whether the author had taken costs as at present or estimated for the future, and **Mr. Moxley** replied that it was taken at estimated future costs. Electricity had increased by 75% since 1935, and he had allowed 3¼% increase throughout the next ten years on those costs, assuming the trend would continue.

Replying to **Mr. J. Newman** (Newport), **Mr. Moxley** said the booster would be of the fan type driven by a constant speed electric motor. It was more economic than the variable speed type, and there was little variation during boosting period.

In answer to **Mr. S. G. Meade** (Newport) the author said it was absolutely essential to maintain pressure relief valves and other equipment properly.

Mr. Day said that one criticism of single mains was that if you doubled the length of services you doubled the risk of leakage. There were wrapped services, of course, but he thought the majority of leaks were due to pitting. He acknowledged the advantages of being able to pull a copper tube through the service, but if there was a leakage the road had to be excavated and that ended the economics.

Mr. Moxley replied that the total sum for single services would come to more than that for dual services, only the road crossings were extra. With regard to wrapped services which were becoming standardised, he would agree that pitting in one spot would result in leakage. It could accelerate far greater than if the service were bare, but they were toying with the idea of putting a small anode on each service to protect it for 20 or 30 years. That, he felt, would be the answer.

'A New Era of Technical Adventure'

(*Continued from p. 302*)

Two examples of pressure gasification have been mentioned (1) involving the direct production of town's gas by mechanisaiton of water gas and (2) by the production of hydrogen and subsequent hydrogenation of fuel. Both processes require tonnage oxygen and for this reason are more suited to base load operation, since in oxygen plants the emphasis is on a design for the continuous production of a given quantity of oxygen per unit time, rather than to operate under variable conditions. For this reason the intermediate production of hydrogen would appear to offer better possibilities from the flexibility point of view. Any hydrogen produced at one stage could be used in an alternative manner during periods of low gas demand, for example, for synthesis work or, alternatively, hydrogenation conditions could be so changed as to produce valuable liquid products as an alternative to gas.

Consideration has and is being given to both methods of pressure gasification that have been described, and quite a considerable amount of practical information and experience which is required for the large scale development of such projects is already to hand. The period of little change in methods of gas manufacture is apparently at an end and a new era of technical adventure is about to begin in our industry. The younger members and new entrants to the gas industry are indeed fortunate at this stage of its development with such a prospect of the challenge of change, added interest and variety. It must be apparent to all of us that basic changes will come fairly rapidly in the gas industry and they must create a demand for a sound knowledge of chemical engineering principles. This is very well catered for by our educational facilities.

Coal Stocks Highest Since War

COAL stocks on November 1 will be at a post-war record level of approximately 22¼ mill. tons, an increase of 1.1 mill. tons in 1955 and 3.9 mill. tons in 1954. One result of this is that coal imports are likely to be reduced next year. Coal imports this year are approximately one-half lower than those of last year and so far this year coal exports and bunkers and imports amount, respectively, to 7.7 mill. tons and 4.5 mill. tons. A reduction in exports for next year is also expected.

The shortage of large coal, due mainly to the effect of power-loading in breaking up coals, is expected to remain a basic problem in the United Kingdoms' coal industry for some time to come. Home production of large coal, at 39.58 mill. tons, is down by more than 2 mill. tons in the comparable period last year. Distributed coal stocks stood at 19.38 mill. tons on October 13, compared to 19.14 mill. tons in the previous week. In addition there are some 2¼ mill. tons at collieries and opencast sites, an increase of .05 mill. last year, while merchants' stocks of house coal and anthracite are high at 1.86 mill. tons.

Total production so far this year, at 172.75 mill. tons shows an increase of 571,000 tons on 1955 figures. Deep-mined and open-cast output figures are up by 200,000 and 371,000 tons respectively.

TRADE NEWS SUPPLEMENT

CHAMBERLAIN INDUSTRIES, Ltd., manufacturers of the Staffa range of mobile and shop cranes, are now offering a hydraulically operated extensible jib crane of Dutch origin mounted on a Mack diesel truck with specially arranged cabin and controls permitting the crane to be operated from the cabin.

The hydraulic system is basically composed of three independent systems—one for luffing, one for hoisting, and one for slewing the crane and extending the jib. The luffing and hoisting system may be interconnected in case of failure of the hydraulic pump of either system, so that the remaining pump can be used to operate both actions.

The pump for slewing and extension is direct driven from the transfer-case whereas the pumps for hoisting and luffing are driven by means of chains and sprocket wheels. The transfer-case power take-off is provided with a double sprocket-wheel, whereas each pump has a single wheel. Thus each pump is driven independently of the other.

The normal clutch, throttle and brake pedals of the truck have been doubled to enable the crane operator to drive the crane from the operator's seat. This seat is situated with the back to the front of the truck. If operations require the truck to be moved over a short distance, the driver can do this while sitting on the crane driver's seat.—*Chamberlain Industries, Ltd., Staffa Works, Staffa Road, Leyton, London, E.10.*

PROTECTION FOR INSULATION

TO meet the many problems associated with providing adequate and economical protection for insulation materials, a completely new form of aluminium covering has been developed by Corrosheath Ltd. in conjunction with Venesta Ltd., the major aluminium foil rollers.

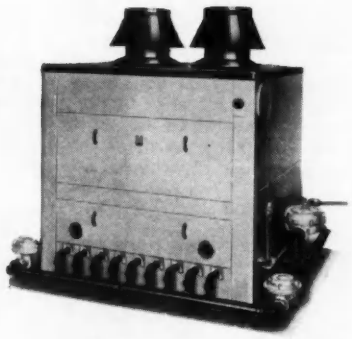
This new Corrosheath aluminium jacketing as it is called is expected to have many varied uses. It will have a particularly wide application in enclosing steam, hot water, chemical, and oil pipes. In fact it provides a great advance over the old 'chicken wire and roofing felt' method as it protects the insulating material completely, and cuts maintenance costs to a bare minimum.

In its manufacture the jacketing is made of .006 in. gauge aluminium foil fabricated with $\frac{3}{16}$ in. corrugations to provide extra strength. The actual alloy used is aluminium 2S hard tempered (BS 1470SK).

Generally the jacketing has a glued-on asphaltic moisture barrier comprised of Kraft Union waterproof paper.

This barrier prevents any possibility of corrosion where the insulation material is alkaline. However, the jacketing is also supplied plain—without the moisture barrier—for use where the problem of corrosion does not arise.

The material, supplied in rolls 100 ft. long by 2 ft. wide, is easily handled and fixed by one man who simply cuts the jacketing to the required size, wraps it round the insulated pipe, and secures it with an aluminium strap at each end of the strip.—*Venesta Ltd., Vintry House, Queen Street Place, London, E.C.4.*



NEW IDEAL GAS BOILERS

AN outstanding feature of the new Ideal No. 3-GBD series gas boiler, which replaced the No. 3-GBC series in September, is its handsome appearance. The jacket has been re-designed, now having rounded corners and entirely enclosing the front platework, and is lined with adequate insulating material.

The front, back and sides of the jacket are enamelled in a most attractive finish of forge red, a pleasing shade mottled with a metallic effect to lend it the appearance of a hammered finish. The top portion and the diverter castings, including diverter jacket ring, are finished in black enamel.

Those parts of the jacket which are removable for cleaning purposes are fitted with neat black plastic handles, while the apertures through which the burner pipes enter the boiler are framed with chromium-plated strips. The front platework is painted black and is sealed with asbestos rope to ensure a gas-tight fit.

A new type of thermostat is fitted, with a dismountable head and sheath which enables it to be removed and replaced with the minimum of inconvenience and labour.

All these improvements are provided with no increase in price and result in a boiler that is eminently suitable for boiler-houses in which both a clean and attractive appearance and the highest functional efficiency are required.

The new No. 3-GBD series gas boiler is available in nine sizes, for hot water and low-pressure steam heating, with ratings from 390,000 to 1,430,000 B.Th.U.'s per hour.—*Ideal Boilers & Radiators Ltd., Ideal Works, Hull.*

NEWAGE DIESEL POWER PACKS

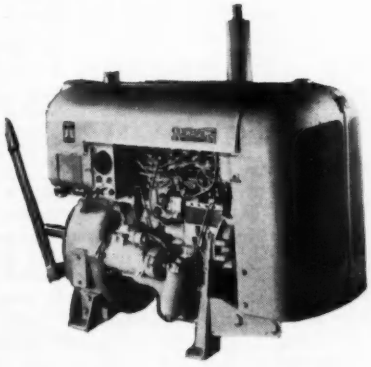
THE 2.2 litre Newage diesel power pack which is now ready for delivery will be shown for the first time in November at the Public Works Exhibition. Newage (Manchester), Ltd. are now able to offer the following range of diesel power packs:—5.1 litre, 3.4 litre, and 2.2 litre.

These power packs incorporate the latest design developments, with the object of producing the most efficient range of power units for industry.

The Newage factory convert the B.M.C. automotive engine for industrial use. The final development of these engines leads to a complete power pack, ready for dropping into agricultural machinery, cranes, welding plant, generators, excavators, crushing plant, earth moving plant, road rollers, concrete mixers, and other industrial machinery.

For normal use, rigidity of the unit is ensured by the attachment of a 3-point mounting. With these modifications and the provision of simple connections, control and instruments, the engine is ready for bedding into the machine to be driven.

The units are complete with radiators of temperate or tropical capacity, fuel tank, silencer, shaft extension, and electric starters. The clutch is operated by a hand lever, which can be fitted on either side, and the canopies are hinged to give access to the engine.—*Newage (Manchester) Ltd., 6, Carlos Place, Grosvenor Square, London, W.1.*



NEW STRIP CHART RECORDERS

A STRIP chart potentiometer recorder with a pen speed of ¼ second (full scale travel) has recently been introduced by Honeywell-Brown Ltd.

The Electronic null-balance servo measuring system incorporates a newly designed 'plug-in' amplifier with a high input impedance and output power. The latter is approximately eight times that of the amplifier used in conventional ElectroniK recorders.

Amplifier output drives a new type of balancing motor having a no load speed of 1,650 r.p.m. A tachometer circuit provides damping which is strictly a function of pen speed, and is adjustable by means of a rheostat.

The ¼ second recorder is designed to meet the demands of scientists and development engineers who need to record rapidly changing variables.—*Honeywell-Brown Ltd., 1, Wadsworth Road, Perivale, Middlesex.*

DENATURING PAINT

A GREATLY improved material, developed to reduce pre-mixing operations and to work at lower concentrations than the older but similar material Detac No. 1, the new Detac No. 3 water-conditioning agent is a readily soluble mixture for the treatment of the re-circulating water in water-conditioned paint spray booths.

The function of Detac No. 3 is to reduce the labour required to maintain paint spray booths in a clean and thoroughly efficient condition and so cut down maintenance costs. It achieves this object by denaturing the overspray, and, by removing all stickiness, preventing its adhesion to reservoir walls, eliminator plates, filter screens and pumps. Also, the denatured paint tends to float on the surface of the water in the reservoir from which it can be skimmed by appropriate means as required. In the case of water treated with Detac No. 3, the period of flotation is a maximum.

Another advantage of Detac No. 3, and a particular asset where booth reservoirs are only cleaned out three or four times a year, is its pleasant perfume, which successfully combats the smell of drowned paint and maintains freshness.—*The Pyrene Co., Ltd., Metal Finishing Division, Great West Road, Brentford, Middlesex.*

ELLIOTT-SWARTWOUT

ELLIOTT Brothers (London), Ltd., announce that they have concluded a licence and technical agreement with the Swartwout Company of Cleveland, Ohio, by which they become the manufacturing licensee and sole agents in the British Commonwealth (except Canada) and Europe for the complete Swartwout range of 'autronic' control and transmission equipment.

This miniaturised all-electronic equipment, embodied in the Swartwout electronic control system, provides a new and revolutionary approach to process and power instrumentation. Transmission lags are completely eliminated from control circuits by employing electronic means for both transmission of measurement data to the control centre and transmission of control impulses back to the processing unit.—*Elliott Bros. (London), Ltd., Century Works, Conington Road, S.E.13.*

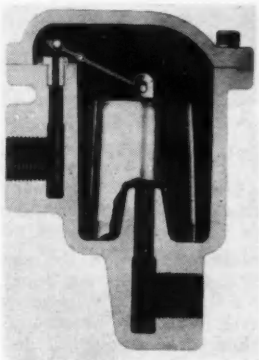
BTR FIRE HOSE

THE BTR Plastidry fire hose stand at the Chief Fire Officers' Conference Exhibition in Hastings was largely devoted to the answering of all technical questions that naturally arise in connection with any such revolutionary product as Plastidry.

In addition, a new all-nylon Plastidry hose was shown for the first time and was available for detailed inspection. This hose marks another major technical advance in that it is stronger, lighter, more flexible, and more compact.—*British Tyre & Rubber Co., Ltd., Herga House, Vincent Sq., London, S.W.1.*

NEW STEAM TRAP

AN entirely new design of inverted bucket steam trap has just been added to the 'Lancaster' range. It has a double leverage action which enables large diameter seatings to be used, giving an extraordinarily large capacity to size ratio.



★

The new inverted bucket steam trap.

★

Made in cast iron for pressures up to 200 PSI.G. saturated, it is at present available in the ½ in. and 1 in. sizes only, but a smaller ¼ in. size will be available shortly. The ½ in. and 1 in. sizes weigh only 7 lb. and can be suspended on the pipe line. The ¼ in. trap will only weigh 4 lb.

All the internal fittings with the exception of the float (which is made in copper) are stainless steel, and it is hoped that before long the trap will be available with stainless steel float.—*Lancaster & Tonge Ltd., Pendleton, Manchester.*

NEW EARTH MOVING EQUIPMENT

THE new Track-Marshall 48 b.h.p. diesel crawler tractor, manufactured by Marshall Sons & Co. Ltd., of Gainsborough, can now be supplied with either a hydraulic angledozer or hydraulic bulldozer. Both the equipments have been designed specifically for the Track-Marshall by W. E. Bray of Feltham, Middlesex.

The Track-Marshall, is powered by the Perkins L4 engine, rated at 48 b.h.p. at 1,600 r.p.m. A six speed gear box gives the tractor a speed range of from 1.31 m.p.h. to 5.15 m.p.h. There are two reverse gears.

The design of the hydraulic system is common to both the equipments, and consists of a live pump, driven from the front of the crankshaft, a reservoir tank containing the control valve assembly which is mounted beside the driver, and two double acting hydraulic rams which lift the blade through quadrant arms.—*Marshall Sons & Co., Ltd., Gainsborough, Lincs.*

MIXING VALVES

A REMARKABLE development in mixing valves is the result of intensive research in this subject by Meynell & Sons Ltd., of Wolverhampton, who, having studied all the disadvantages, both major and minor, of the average mixing valve in present day use, have now produced a model which is claimed to be superior to, and more economical than any other model on the market.

The Meynell steam water heater, Mark IV as it will be known, is now in the process of being manufactured on a large scale as it is calculated that a large demand will be forthcoming for this revolutionary model, when marketing and sales promotion is fully under way. Whereas the normal type of mixing valve has been a source of constant nuisance to the heating engineer, through the noise of operation (particularly where the need for silent working is of extreme importance, such as in hospitals, first aid posts, etc.) the Meynell mixing valve is noiseless. Another positive advantage is its ability to operate on inlet service pressures up to 150 p.s.i. steam and 5 p.s.i. water or vice-versa.—*Meynell & Sons Ltd, Montrose Street, Wolverhampton.*

STICK-A-SEAL

THE leaflet enclosed with every pack of 'Stick-a-seal' self-adhesive plastic foam illustrates its many and varied uses in the home, office, factory, and garage even though its primary function is as a low cost draught exclusion medium.

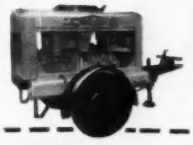
Special instructions as to its application in cold or damp weather and on occasions when it is applied to particularly porous surfaces are also dealt with by this leaflet, not least, being the re-flowing or reactivation of the adhesive in certain circumstances.—*Sealdraught Ltd., Chandos House, Buckingham Gate, S.W.1.*

Cooler air is cheaper air

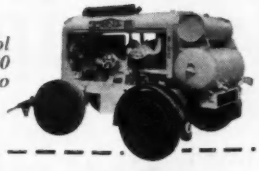
Model ATS/139/PD2–2 Tool Plant: Free Air Delivered: 120 CFM (Output guaranteed to B.S.S. 726).

10-20% more air for the same power—the secret of the greater efficiency of "BRISTOL" Duplex Airflow-Cooled 2-Stage Heavy Duty Portable Air Compressors lies in cooler (and therefore cheaper) air delivery—the essence of "BRISTOL" compressor design—obtained by 2-stage compression and patent 2-stage airflow cooling.

Model ATS/80/PD2—1 Tool Plant; Free Air Delivered: 68 CFM. (Output guaranteed to B.S.S. 726).



Model ATS/139/PD4—2 Tool Plant; Free Air Delivered: 120 CFM. (Output guaranteed to B.S.S. 726).



Model ATS/188/PD4—3 Tool Plant; Free Air Delivered: 164 CFM. (Output guaranteed to B.S.S. 726).

Publication No. 76 gives further information and details of the "BRISTOL" range, including all models shown on this page—send for your copy today!

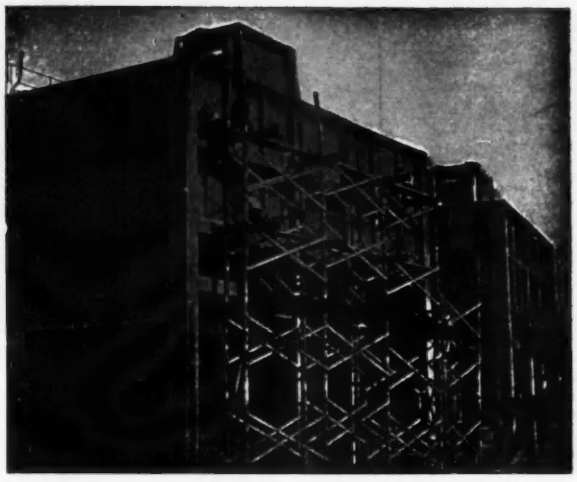
BRISTOL **AIR COMPRESSORS**

BRISTOL PNEUMATIC TOOLS LTD., FISHPONDS, BRISTOL.
Tel: Bristol 65-3264.*

dm BT.13

Visit our stand at the Public Works and Municipal Services Exhibition, Olympia, November 12-17

Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

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Telephone: Victoria 7877 & 6275

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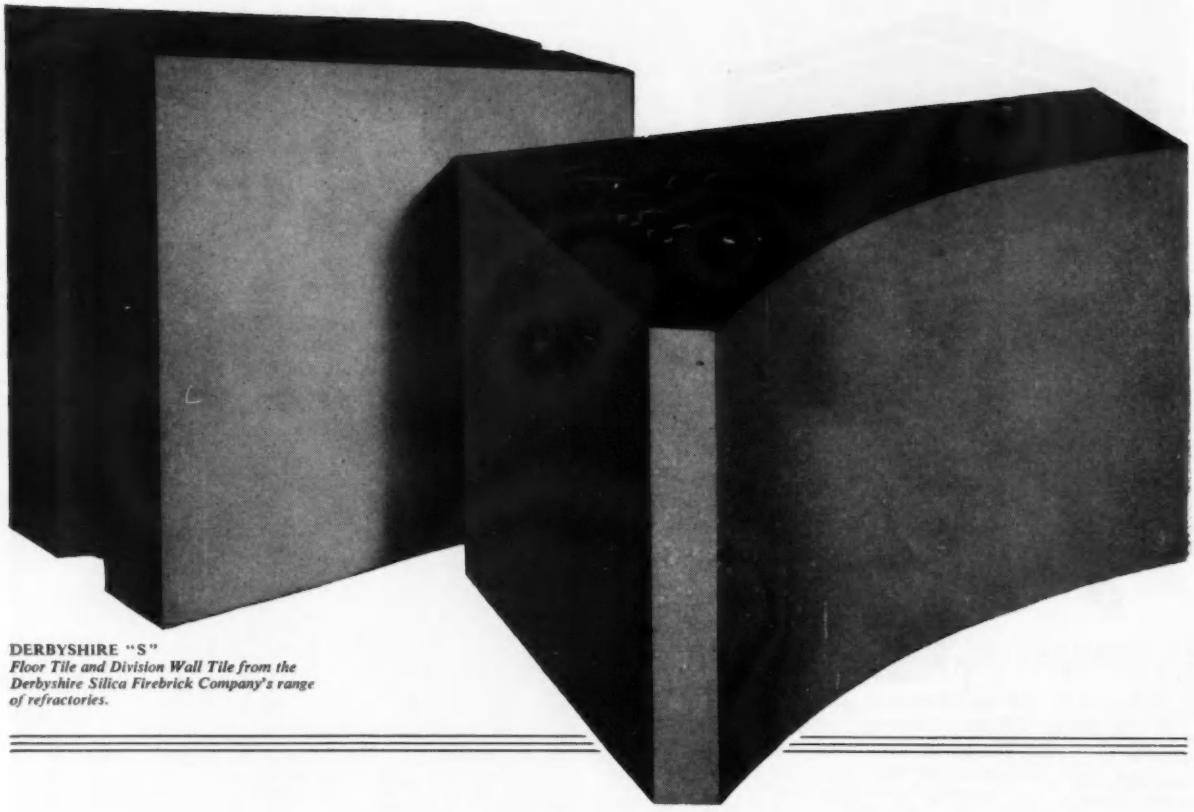
Handbook "GUNITE" sent on request



DERBYSHIRE "S"
Floor Tile and Division Wall Tile from the Derbyshire Silica Firebrick Company's range of refractories.

DERBYSHIRE SILICA—the name known throughout industry for first class refractories.

DERBYSHIRE "S" and "D.S.F."
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Refractories for all purposes including Vertical and Horizontal Retorts, Soakers, Puddling Furnaces, Reheating and Annealing Furnaces, Forge Furnaces, Checkers, Cupolas and Glass Furnaces.

Other D.S.F. products include
PEAKSIL *(95% Silica)* FRISIL *(Sillimanite)*
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(The new British Plastic Refractory)
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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/6d.; by post 1/8d.

Subscription Rates:—65/- per annum; (Payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/6 per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN & MIDLANDS REPRESENTATIVE: A. Engelhardt, T.D., 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

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Oxide supplied on loan or sale outright. Highest prices paid for Spent Oxide.

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YES, FACE IT:

FOR 5 MINUTES !

We must fight the Fire Fiend ALONE before the Fire Brigade gets here. Please send details of NU-SWIFT rapid and reliable Fire Extinguishers—BEFORE IT IS TOO LATE !

Name.....

Address.....

Post NOW to Nu-Swift Ltd. 25 Piccadilly W.1.

In Every Ship of the Royal Navy

"KLEENOFF" *

THE COOKER CLEANER

"KLEENOFF"

FIBRE BRUSHES
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"KAY-DEE" *

KETTLE DESCALER

For resale to the public and in bulk for works use.

BALE & CHURCH, LTD.

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AGENCY

REPRESENTATIVES calling on large Organisations, Factories and Architects can earn extra £1,200. Repeat business.—DOHM, Ltd., 167, Victoria Street, London, S.W.1.

EDUCATIONAL

THE UNIVERSITY OF LEEDS

DEPARTMENT OF GAS ENGINEERING AND GENERAL FUEL SCIENCE WITH CERAMICS

APPLICATIONS are invited for two posts of LECTURER or ASSISTANT LECTURER, one in Gas Engineering and one in General Fuel Science, at salaries on the scale £650 x £50—£1,350 a year for a Lecturer or within the range £550-£650 a year for an Assistant Lecturer, according to age, qualifications and experience. Applications (three copies) stating date of birth, qualifications and experience, together with the names of three referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained) not later than December 10, 1956.

PUBLICATIONS

GAS ACCOUNT CALCULATORS

SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.

'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

APPOINTMENTS VACANT

THE METAL BOX COMPANY, LTD., The Technical Engineering Division require the services of a SENIOR ENGINEER to take part in supervision of their Field Erections in this country and overseas, dealing with Conveyor Ovens and Industrial Heating Processes generally. The successful candidate will need experience in this particular field and in overall supervision of outside work. The post which is one of considerable responsibility will be well paid. Applications with full information should be addressed to the Personnel Officer, Technical Engineering Division, The Metal Box Co., Ltd., Chandos Road, N.W.10.

VACANCIES occur in the outside engineering department of Strachan & Henshaw, Limited, St. Philips, Bristol, for Engineers capable of organising and controlling the erection of contracts of various types of mechanical handling plant. Staff appointments will depend on the qualifications of the applicant who should write giving full particulars to the Chief Engineer.

NORTHERN GAS BOARD

SUNDERLAND DIVISION
SENIOR ENGINEERING ASSISTANT

APPLICATIONS are invited from suitably qualified persons over 25 years of age for the above appointment at Sunderland—commencing salary within the National Salary Grades A.P.T. 9/10 (maximum £920 per annum) according to experience and qualifications.

Candidates should be experienced, engineering draughtsmen with sound knowledge of the construction and maintenance of Gas or Chemical Works Plant and Buildings and possess the Higher National Certificate in Mechanical Engineering or equivalent qualification.

The successful candidate will be required to pass a medical examination and join the Board's Pension Scheme.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the undersigned not later than November 7, 1956.

W. O. KIRKWOOD,
Divisional General Manager.

Fawcett Street,
Sunderland.
October 17, 1956.

NORTHERN GAS BOARD

DARLINGTON DIVISION
SENIOR TECHNICAL ASSISTANT—
DARLINGTON UNIT

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT at the Darlington Unit.

Applicants should be qualified to undertake full responsibility under the Works Manager, for supervision of the chemical staff, control of a G.W. Vertical Retort Installation, modern C.W.G. Plants and ancillary equipment. Corporate Membership of the Institution of Gas Engineers or equivalent qualification will be an advantage.

The salary will be within Grade APT. 9 Provincial 'A' (£755 to £855 per annum) of the National Salary Scales, initial placing according to experience and qualifications.

The successful applicant will be required to pass a Medical Examination and join the Board's Pension Scheme.

Applications, stating age, experience, qualifications and the names of two persons to whom reference can be made should be addressed to the undersigned not later than November 10, 1956.

F. WILSON,
Divisional General Manager.

Gas Offices,
John Street,
Darlington.

(*Classified advertisements continued on page* 314)

APPOINTMENTS VACANT (ctd.)

WALES GAS BOARD

INDUSTRIAL GAS ENGINEERS
NORTH AND SOUTH WALES

APPLICATIONS are invited for two ASSISTANT INDUSTRIAL GAS ENGINEERS, within the salary range of A.P.T. 10 (Provincial "A" £820/£920 per annum) of the National Salary Scales for Gas Staffs.

Applicants should have experience in the design, construction and installation of industrial and commercial equipment, and should have passed the associate membership examination of the Institution of Gas Engineers, or possess an equivalent qualification. The position is pensionable.

The successful applicants will be required to pass a medical examination.

Applications, stating age, educational qualifications and experience, together with the names of two referees, should be addressed to the undersigned not later than November 19, 1956.

C. B. MAWER,
Secretary to the Board.

2, Windsor Place,
Cardiff.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
APPOINTMENT OF DEPUTY GROUP MANAGER,
SCUNTHORPE

APPLICATIONS are invited for the above appointment from candidates who should have had practical experience of a modern gasworks with special reference to horizontal retort practice, a corporate membership of an approved Institution of Gas, Civil or Mechanical Engineers, and sound administrative ability.

The successful applicant will be responsible for the control of production and technical efficiency of the works and in the absence of the Group Manager will be responsible for the co-ordination of all functions of the Group.

The commencing salary will be not less than £950 per annum.

APPOINTMENT OF WORKS CHEMIST,
SCUNTHORPE

APPLICATIONS for the above appointment are invited from persons who should be qualified to undertake all the usual tests applicable to the efficient control of modern carbonising and ancillary plant, and able to supervise the chemical duties of junior technical personnel.

The commencing salary will be within Grades A.P.T. 5/6/7 (£575/£750 p.a.) according to age, qualifications and experience.

The above posts are pensionable and the successful applicants will be required to pass a medical examination.

Applications stating age, and giving details of education, training and experience together with the names of two referees, should be addressed to reach the undersigned by not later than November 10, 1956.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

October 26, 1956.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
AMENDED ADVERTISEMENT
DISTRIBUTION ENGINEER—WELLINGBOROUGH GROUP

APPLICATIONS are invited for the post of DISTRIBUTION ENGINEER, Wellingborough Group. The appointment will be made within Grades APT. 11/12 (salary range £850/£1,025) and the salary at commencement will be dependent upon the qualifications and experience of the successful applicant. An attractive four-bedroomed house will be available, on reasonable terms under the provisions of a standard Service Occupation Agreement, for the person appointed.

Applicants, who should possess the Higher Grade Certificate in Gas Engineering (Supply) of the Institution of Gas Engineers, or its equivalent, must have had considerable experience in a modern Gas Distribution Department and should be competent to supervise systems involving the use of low, medium and high pressure mains with district holders.

The Distribution Engineer will have overall responsibility for the distribution function within the Group, which comprises the Wellingborough, Rushden, Kettering and Corby districts with approximately 45,000 consumers. He will also be responsible for Holder Stations and general property repairs and maintenance in the Group.

The post is pensionable and the successful applicant will be required to pass a medical examination. Applications stating age and giving details of education, qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than November 10, 1956.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.

SCOTTISH GAS BOARD

NORTHERN DIVISION
SENIOR TECHNICAL ASSISTANT

APPLICATIONS are invited for the appointment of SENIOR TECHNICAL ASSISTANT at Aberdeen Gas Works. Candidates should hold the Higher Grade Certificate in Manufacture of the Institution of Gas Engineers or equivalent qualification, and should be fully experienced in the operation and control of modern carbonising and ancillary plant.

The salary will be within A.P.T. Grade 8 (£710-£790 per annum) Provincial "A" of the National Salary Scales for Gas Staffs. The position is pensionable and the successful applicant will be required to pass a medical examination.

A modern house will be available to rent.

Applications stating age and giving particulars of education, training, experience and qualifications should be addressed to the undersigned to arrive not later than November 19, 1956.

H. S. MILNE,
Divisional Controller.

50, Cotton Street,
Aberdeen.

October 27, 1956.

WEST MIDLANDS GAS BOARD

BIRMINGHAM & DISTRICT DIVISION
ASSISTANT CHEMIST—SWAN VILLAGE WORKS

CANDIDATES must have experience of all aspects of chemical control and should preferably have attained the standard of Higher National Certificate.

The salary will be within A.P.T. Grade 7 (£670-£750 p.a.) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating personal details, particulars of training and qualifications, together with names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him not later than November 5, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

MECHANICAL TRANSPORT OFFICER

APPLICATIONS are invited for the post of MECHANICAL TRANSPORT OFFICER at Area Headquarters in Birmingham

The successful applicant, who will be responsible to the Board's Coal and Transport Manager, will be required to advise the Board on all matters relating to road transport including purchase, maintenance and operation of vehicles, and to co-ordinate this work in the seven divisions of the Area. The present fleet consists of approximately 500 vehicles of all types.

Applicants should have a professional qualification and have had wide experience in running a large transport fleet.

The salary for the post will be within Grades B (£1,105 × £40 to £1,265) or C (£1,225 × £50 to £1,425) of the Senior Gas Officers Salary Scales, according to the qualifications and experience of the person appointed.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him not later than November 12, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM & DISTRICT DIVISION
VACANCY FOR
SENIOR HOME SERVICE ADVISER,
BIRMINGHAM DISTRICT

APPLICANTS should be capable of organising and developing the work of the Home Service Section and the indirect promotion of Gas Sales and Service with the aid of a small staff. They must hold appropriate Domestic Science Diplomas and also be experienced in general Home Service work, including the conducting of demonstrations, practical classes and home visiting.

The post is pensionable and the successful candidate may be required to pass a medical examination.

The salary will be within A.P.T. Grade 6 of the National Transitional Scales for Female Staffs, Stage 2, £538-£608 per annum, proceeding to £690 per annum by January 1, 1961.

Applications stating age and giving details of training and experience, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him by not later than November 12, 1956.

J. C. INGRAM,
Secretary to the Board.

HEATING & COMBUSTION ENGINEER required by well-known Chemical Engineers in Victoria. Duties will include design and technical sales of a wide variety of heat using plant. Qualifications required are B.Sc. or equivalent and at least three years' experience in Industry. The position is permanent, pensionable and offers good prospects. Write stating age, experience and salary required to No. 299, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

MANUAL OF GAS FITTING

R. N. LE FEVRE, *M.Inst.Gas E., A.M.I.Mech. E.*

Completely covers the theory and practice of Gas Installation Work and the Servicing of Appliances and Equipment—a possession essential for Students, Sales and Service, Distribution and Fittings Personnel.

Crown 8vo. : 895 pages, 666 illustrations.

Price **35/-** *inc. postage*

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NORMAN S. SMITH AND R. N. LE FEVRE.

For those on the 'Supply' side and Students of the courses which comprise the Gas Education Scheme.

Crown 4to : 138 pages 155 diagrams.

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PLANT &c. FOR SALE

SPECIAL OFFER:

7,600 ft. of unused 21 in. flanged tube ⅜ in. thick, approximately 15 ft. lengths. Flanges 27 in. diameter, drilled 24 holes for 1 in. bolts on 24¼ in. pitch circle. Delivery ex stock.

The Midland Iron & Hardware Co. (Cradley Heath) Ltd., Cradley Heath, Staffs. Tel.: Cradley Heath 6264 & 5.

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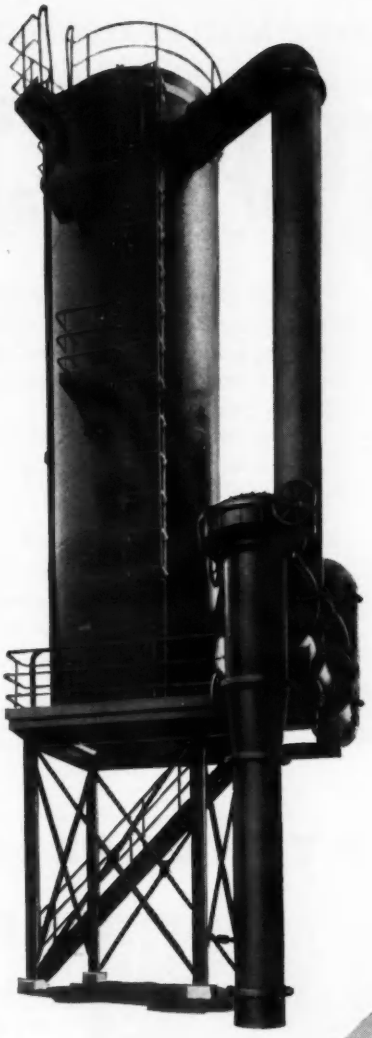
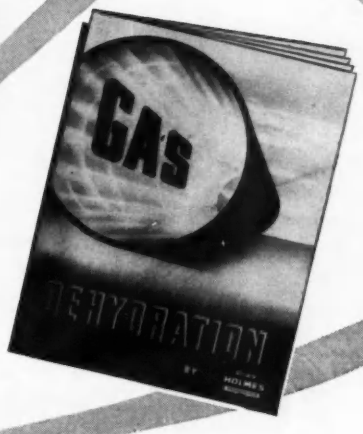


DEHYDRATION BEFORE TRANSMISSION

In the past nearly all Gas Dehydration Plants have been supplied for operation before local distribution. With the modern development of high pressure grid distribution schemes, some plants treat the gas before transmission. The above illustration is one of these; it shows a Counter Current Type Gas Dehydration Tower capable of working up to 25 lbs. per sq. in. gauge. Capacity 24 million cubic feet per day.

Full details contained in publication Number 38/5



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HOLMES
HUDDERSFIELD

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TYPE 3 MIXTURE CONTROLLER

for accurate control of air blast systems

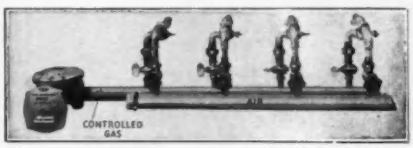
The Type 3 is the latest development in mixture controllers. Its function ensures exact proportioning of air and gas over a wide range of volumes despite the slightest variation of pressures.

Air pressures between ¼ lb. and 1 lb. are used normally but in special instances up to 2 lb. can be used.

Of robust unit construction, the assembly consists of a diaphragm valve, monitor governor and an injector which can be set in any one of four standard positions on site.

The Type 3 mixture controller is available in four sizes 1", 1¼", 1½" and 2". Write or 'phone now for particulars.

The Type 3 zero governor is a modification of the controller. Providing individual control of burners, it gives greater effective control of heat distribution, facilitates burner ignition and has greater sensitivity and range than previous types.



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Keith Blackman Ltd
MILL MEAD ROAD, LONDON, N.17
TEL: TOTTENHAM 4522 (12 LINES)

If air blast arrangements are not already installed a K.B. High Pressure fan will provide, as a rule, greater efficiency and economy than a positive blower or compressor of equal capacity. These fans may be supplied with or without K.B. made motors as required.

601

BUCKLERSBURY HOUSE TO STAND ON 3,500 BORED PILES

This important Office Building in the City of London, 17 storeys high including the basement floors, is supported on Cementation Bored Piles. Approximately 3,500 were constructed well within the contract time despite the fact that delays were unavoidably occasioned by the deliberations on the fate of the Mithras Temple discovered on the site and other major difficulties inevitable on such a large site.

The construction of a surrounding wall to retain the adjoining Queen Victoria Street, Cannon Street and Bucklersbury was greatly facilitated by the use of our bored piles.

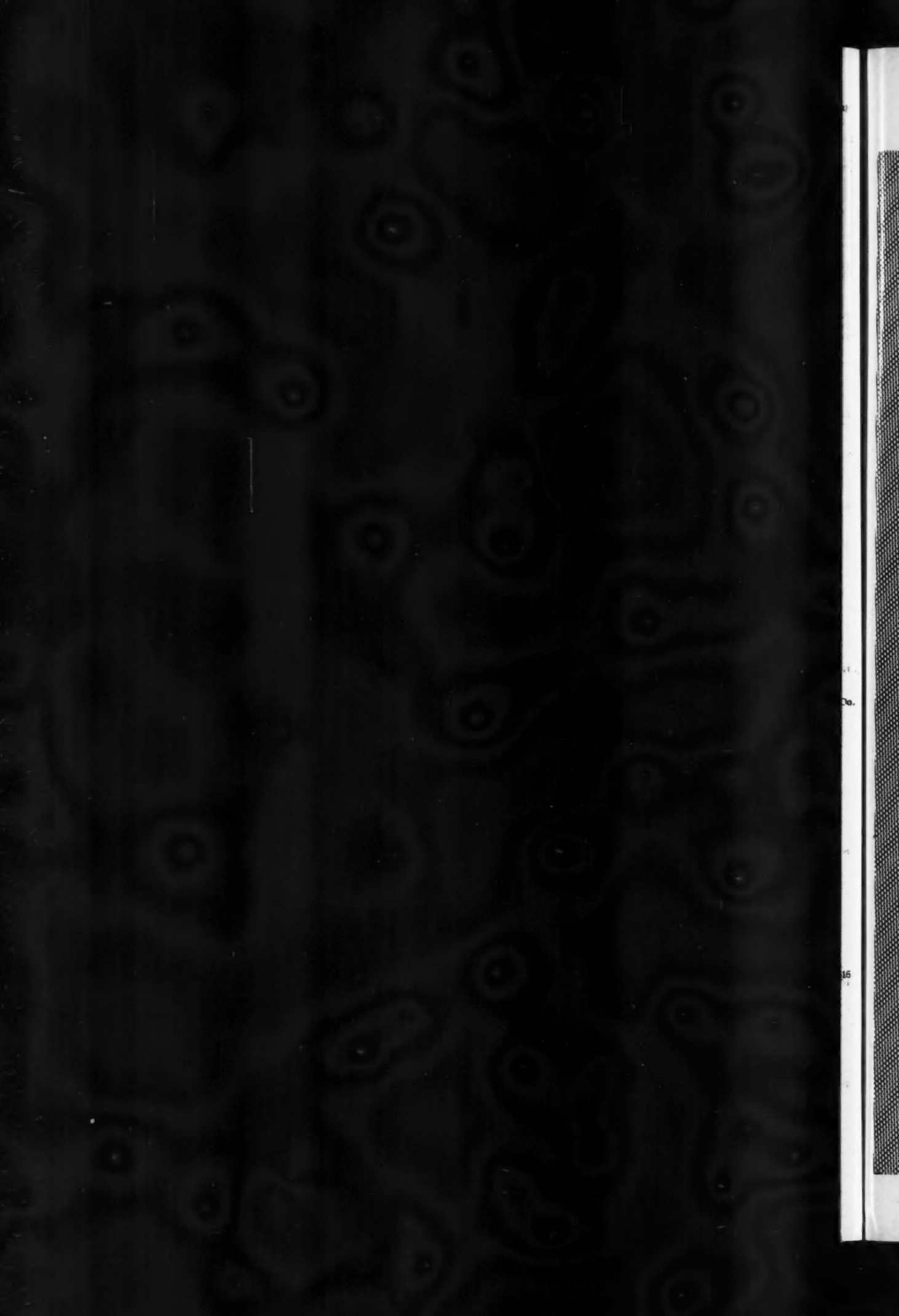
The close proximity of important buildings including the Mansion House and services such as the Underground Railway made it necessary to reduce noise, vibration, etc., to an absolute minimum.

The CEMENTATION COMPANY LIMITED

London Office: 20, Albert Embankment, S.E.11. Telephone: RELiance 7654

BENTLEY WORKS, DONCASTER. Tel: 54175-6-7-8-9

Registered as a Newspaper. Printed by STRAKER BROTHERS LTD., E.C.2 for WALTER KING LIMITED, 11, BOLT COURT, FLEET ST., LONDON, E.C.4., Wednesday, Oct. 31, 1956



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CARBONIZING SYSTEMS

WEST'S GAS IMPROVEMENT CO. LTD

OFFERS:—

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CONTINUOUS VERTICAL RETORTS

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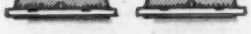
The RED-RAY GRILLER

Something NEW in the RESTAURANT, SERVICE BAR and GRILL-ROOM

3 POSITIONS of BURNERS

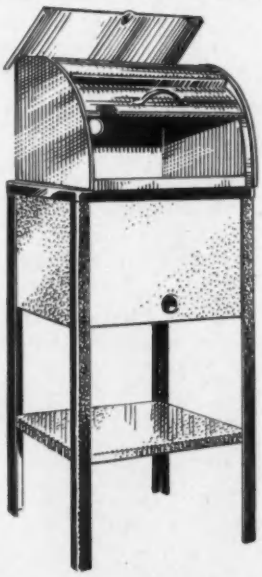
① For GRILLS

② For SPIT ROASTING
A stainless Steel Spit complete with Basting Tray can be fitted as an Optional Accessory.



③ For MIXED GRILLS SAUSAGES, TOMATOES ETC.

The penetrating Infra-Red Rays cook steaks and chops to perfection in 3½ minutes at a cost of less than one half-penny.
The 'COLWIN' RED-RAY GRILLER is finished in White and Grey Mottled Vitreous Enamel with plated Anti-Corrosive easily cleaned fittings.
DIMENSIONS: Height 16¾" Width 18½" Depth 17¾" Weight 57 lb.

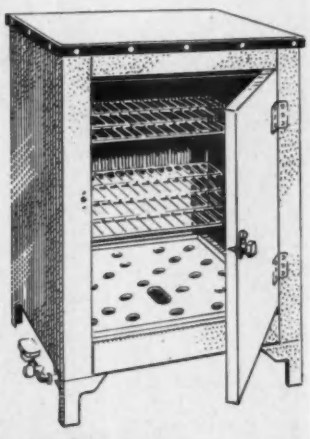


'COLWIN 1'
CHIP AND FISH RANGE

A compact range with a Pan 13" × 13" × 7" in dimension to supply small quantities of chipped potatoes at short notice.

The 'COLWIN'
HOT CUPBOARD

An inexpensive warming oven for use where it is necessary to keep hot, dishes, plates and meals. Right or left hand, or double doors.
DIMENSIONS: 2' 11" high 2' 0" deep 2' 0" wide



Leaflets and Technical Details on request

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